Development of a Renewable Energy Assessment and Targets For Yorkshire and the

Final Report to Government Office Yorkshire and the Humber

VOLUME 2 – Annexes

April 2002

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Development of a Renewable Energy Assessment and Targets for Yorkshire and the Humber

FINAL REPORT to

Government Office for Yorkshire and the Humber

CONTENTS OF VOLUME 2

GLOSSARY

AMWS	Average Mean Wind Speed : An indicator of the relative strength of the wind energy resource at a particular location
AONB	Area of Outstanding Natural Beauty
DEFRA	Department for Environment, Food and Rural Affairs
DTI	Department of Trade and Industry
DTLR	Department for Transport, Local Government and the Regions
EC / EU	European Community / European Union
GWh	Gigawatt-hour : a unit of energy, used to show how much energy is actually generated from a scheme
ha	Hectare : A unit of land area (100ha ≡ 1 km^2)
km	Kilometre
kW	Kilowatt: A unit of power, which indicates a capacity to generate energy. Domestic photovoltaic installations might typically be of "kilowatt" size.
kWh	Kilowatt-hour: a unit of energy, used to show how much energy is actually generated from a scheme (1 GWh = 1000 MWh = 1,000,000 kWh)
kW_p	Kilowatt peak output : the power capacity of a photovoltaic cell measured under standard conditions
M/s	Metres per second : an indicator used to measure wind speeds
MW	Megawatt: A unit of power, which indicates a capacity to generate energy. Large wind turbines have a capacity of about 1 MW or more.
NFFO	Non-Fossil Fuel Obligation : A previous Government approach to the encouragement of renewable energy schemes, currently in the process of being superseded by the Renewables Obligation
odt	Oven-dry tonne : A unit typically used for expressing weights of biomass (the moisture content of biomass greatly influences its weight)
PIU	Performance and Innovation Unit (of the Cabinet Office)
PPG	Planning Policy Guidance
PV	Photovoltaics
RE	Renewable Energy
REF	Regional Energy Forum
RO	Renewables Obligation : The Government's new approach to encouraging renewable energy electricity production
RPG	Regional Planning Guidance
RSDF	Regional Sustainable Development Framework
SRC	Short Rotation Coppice : Fast-growing coppice crops such as willow which can be used to provide additional biomass for fuel
Yr.	Year

ANNEX A PROJECT BRIEF

Targets for the Development of Renewable Energy in Yorkshire and The Humber

Study Brief issued by the Government Office for Yorkshire and The Humber

1. INTRODUCTION

1.1 The Government has set a target that 5% of UK electricity requirements should be met from renewables by the end of the year 2003 and 10% by 2010. Ministers agreed that a strategic approach to renewable energy provision needed to be developed at the regional level as a key mechanism for translating the targets into suitable development on the ground. It was proposed that assessments of each region's capacity to generate electricity from renewable energy sources be undertaken, and that these should lead to the production of renewable energy generation targets that can be related to the UK's overall 'electricity supply from renewables' target.

PPG 11 "Regional Planning" and the Department's advice on "Preparing Regional Sustainable Development Frameworks" indicate how the outputs of such work will be reflected in RPG and the Sustainable Development Frameworks.

1.2 In our region, draft RPG to 2016 has now been issued by the Secretary of State following an Examination in Public held over summer 2000. The region's RSDF document was also formally launched in February 2001. Both documents reflect the broad Government targets for renewable energy but await the results of the region's Renewable Energy Assessment Study as an important input into early revisions of both documents, and the development of an integrated energy strategy for the region. Work by the Regional Development Agency 'Yorkshire Forward' under the ambit of a Regional Energy Forum is also looking to exceed the government's targets, and take forward that integrated energy strategy.

1.3 However, it is essential that any study undertaken includes wide public and regional stakeholder involvement in the development of these assessments and targets. The study process must ensure wide regional acceptance and ownership of the study outputs, and facilitate a more positive approach to renewable energy in the land use planning system and a wider acceptance of specific projects.

2. STUDY OBJECTIVES

2.1 In this context the Government Office for Yorkshire and The Humber is commissioning this study with support from DTI/DTLR. The completed study will have a key role in facilitating the development of Renewable Energy in the region and contributing to the Government's Climate Change strategy. It will assist the Yorkshire and Humber Yorkshire and Humber Assembly and Regional Chamber in the review of RPG and RSDF, and aid the local planning authorities in their development plan work and consideration of individual proposals for renewable energy development.

2.2 The Consultant will be expected to ensure that the involvement of public and regional partners will be actively participatory, recognising their important role in the development of the study assessments and targets, and its final ownership and take up within the region. In undertaking this work it will be essential for the Consultants to seek to build consensus between groups who may have different perspectives. A key measure for the success of the study will be the increased regional ownership of renewable energy generation within the region and a commitment to the delivery of the targets for generation derived through the study.

2.3 The principle objectives for the study to deliver are the following:

1. An assessment of the region's capacity to generate electricity from renewable sources and the establishment of targets for the development of renewable energy generation in Yorkshire and The Humber initially to 2010, and then beyond this to 2021. Providing targets to 2021 is required to assist the next review of RPG.
2. Targets must be sub divided between different renewable energy sources and the following sub regions in Yorkshire and The Humber:
    - 'Humberside'
    - North Yorkshire
    - South Yorkshire
    - West Yorkshire.

   Sub–targets should be set for individual Structure Plan and Unitary Development Plan areas where it is sensible to do so. Our region is a varied one, and it is anticipated that any targets will reflect different parts of the region making different contributions to individual elements of renewable energy generation.
3. Targets must be expressed as 'MW installed targets, which translate at 2001 baselines to a % of overall generation capacity and % of consumption targets for the region', and include time-scales/ delivery profiles. Whilst this work will have regard to the Government targets, they are not to be regarded as a limit or 'final' provision for renewable energy within the region.

2.4 In meeting objectives (1) – (3) the study will be expected to:

- Build on what information already exists. (Some renewable energy resource studies have been undertaken for the region - principally the LYREPS study but also more recently the work by BWEA);
- Take advantage of the experience and information already identified in similar regional studies in the UK. The study is expected to draw on established methodologies for the costs of generation of technologies to avoid duplicative work. Assessments will take full account of the government assumptions of medium and long term energy prices and proposed levels of support in deriving targets;
- Provide assessments and targets that will be both challenging and realistically owned / delivered within the region initially by 2010, and beyond to 2021.

2.5 The study will then be expected to:

4. Identify how those individual elements and targets will be delivered, and make recommendations on areas where specific types of renewable energy development should be encouraged.

5. Define broad locations for specific renewable energy development, and set out criteria, model policies, case studies and examples of good practise, to help local authorities select suitable sites and support applications for development.
6. Identify any barriers to those assessment targets being realised and solutions to enable them to be overcome.
7. Identify any robust and economically realistic opportunities where promotion of specific renewable energy development proposals can bring significant overall benefits to the region and its economy.
8. Identify where specific types or scales of renewable energy development will be resisted, or not counted towards the regional renewable energy targets. These recommendations will need reasoned justification and make clear the implications for the region's renewable energy targets.
9. Produce an Action Plan with priorities for implementing study recommendations, and
10. Set out appropriate Indicators and Delivery Profiles to assess future performance at all levels across the planning framework.

2.6 This study work concentrates upon renewable energy generation, but regard will also need to be had to its contribution to the proposed integrated energy strategy for the region. That wider strategy could be expected to include proposals and targets for reductions in the rate of growth of overall energy consumption, and for energy conservation and energy-efficiency measures to improve the overall energy efficiency of consumption within the business, domestic and transport sectors. Where the outputs from this study can contribute to this wider strategy this should be highlighted.

3. STUDY AREA BOUNDARY

3.1 The operational boundary of GOYH differs slightly from that used for Regional Planning Guidance purposes, because of the National Parks which cross regional boundaries. For general study purposes the boundary to be used should be that used for RPG. However, the study will need to consider the treatment of regional boundaries as they affect individual energy resources, such as wind or biomass. It will also need to reflect the slightly different local authority boundaries for the region when setting out specific targets.

4. THE STRUCTURE OF THE STUDY

This section describes GOYH initial views on the main tasks involved in the study.

4.1.1 After establishing a baseline of existing generation, preparation of potential resource assessments for the following key areas:

- Wind (onshore and offshore)
- Hydro (principally small scale)
- Biomass, and Energy from Crops.
- Photovoltaics
- Active Solar
- Landfill gas
- Incineration
- Wave and tidal power

Other potential sources may be proposed, i.e. methane from disused mine workings, and should be identified where appropriate.

4.1.2 In this region onshore wind and biomass are probably the most significant, and, together with small-scale hydro and off shore wind, these are likely to be the main focus for work within the Study. The Humber area and coastal region of North Yorkshire would appear to offer a significant offshore wind resource. However, the recent announcement by Crown Estates and DTI of the first phase sites for offshore development did not include our region. This study will need to consider what, if any, constraints exist to offshore development in our region and the longer term potential for any second phase, or beyond 2010.

4.1.3 Resource assessments will be expected to draw strongly on established methodologies already developed and used in other regions to avoid duplicative work.

4.2 Limitations Imposed By Planning And Wildlife Considerations

4.2.1 For each renewable energy source in turn: to evaluate the effect of planning and other restrictions. For example for the 'Wind' resource:

(a) **Establishment of a GIS to hold the data.**
(b) **Evaluation of the region's landscape and countryside character areas.**

4.2.2 This will be expected to take advantage of the methodologies already developed and used in other regional studies. It will take a balanced approach, recognising the need to give full weight to landscape character in any assessment but should not be unduly constrained by existing appraisals and designations. It will involve establishing a 'quality continuum' with degrees of acceptability for renewable energy development and providing a methodology to aid wider public discussion and agreement on what it is about each area that matters. The results of the above exercise will be mapped into a GIS.

(c) **Establishing the current planning constraints and opportunities**

4.2.3 Constraints and opportunities will be drawn out and agreed as part of the participatory process. It will be the role of the consultants to set objective and challenging proposals for both constraints and opportunities. As part of that process, it will be important to increase familiarity and understanding of the renewable energy technologies concerned, to identify outstanding anxieties and concerns and find ways of resolving them. Participants might be expected to raise a wide range of aspects, including the contributions of landscape value/impact, settlement characteristics, residential and visual amenity, noise, biodiversity, high-quality agricultural land and local employment opportunities in any assessment.

4.2.4 Assessments should identify positive opportunities arising from the take up of each resource such as brownfield sites, industrial areas, or existing buildings and development as potential locations for renewable energy development, or other benefits that might arise - such as the potential for CHP and community heating.

4.2.5 A significant part of the region is covered by statutory designations. A regional view will need to be agreed on the acceptability and scale of different types of renewable energy

development, within or adjoining those areas. This must also recognise the implications of those decisions for the region's ability to meet any regional targets for renewable energy.

(d) Synthesis of b) and c)

Noting any inconsistencies or differences between the study's quality assessment and the current planning designation framework

(e) Mapping the results into a GIS

4.2.6 A similar, but less complex, approach will be needed to evaluate the effect of planning and other restrictions, and opportunities on biomass and energy from crops, landfill gas, hydro, incineration, active and passive solar.

4.3 Limitations and Opportunities for Embedded Generation

4.3.1 An assessment is required of energy generation and usage by sub-region to establish a baseline, and to assess the adequacy of the current and planned distribution network for future patterns of energy generation and demand. It is essential that this assessment is made at the sub–regional level, and desirable if this can be produced for the individual Structure Plan, UDP or group of UDP areas.

(a) Identification of broad areas where embedded generation would particularly help the electricity supply network by providing new capacity (and possibly avoid system reinforcement costs)
(b) Identification of broad areas where there are limits to the addition of embedded generation without significant system reinforcement costs
(c) Capture of the above data into a GIS compatible with other elements of the Study

5.3 Synthesis Of The Above Data And Findings And The Establishment Of Targets To 2010

4.4.1 The study will identify challenging but economically realistic targets by resource, regionally and sub-regionally, (and by Structure Plan and Unitary Development Plan area if reasonable to do so) initially to 2010, and then beyond to 2021.

4.4.2 These targets might possibly be at three levels: challenging (but technically possible), realistic (and achievable), and 'minimalist' (or business as usual). However, the key test will be the likelihood of implementation. The study will need to identify the factors that may affect which level occurs, including commercial viability and planning constraints. The study should also identify what needs to be done, by whom and by when for higher levels of performance to be delivered. The study will indicate through outputs from workshops/ consultations/ stakeholder position papers etc. that these targets are owned and agreed.

4.4.3 For example for the 'Wind' resource:

(a) **Synthesis of data, establishing a 'realistic' resource.** This task will include the identification of broad areas for large-scale and small-scale wind development

(b) **Final establishment of economically realistic targets by resource,** regionally and sub-regionally, and by Structure Plan and Unitary Development Plan area (if reasonable to do so)

A similar, if less complex, process will be needed to identify areas for other significant renewable energy sources.

4.4.4 This is a critical stage within the Study. It is expected that it will require a series of 'feedback loops' to allow the targets to be discussed by the Steering Group and a wider reference group, and for all to be confident of regional ownership, before the report is finalised.

4.5 Providing Planning Guidelines For The Delivery Of Renewable Energy Targets.

4.5.1 in response to the Study findings and suggestions for targets, the study will:

(a) Identify how those individual elements and targets will be delivered - making recommendations on areas where specific types of renewable energy development should be encouraged or resisted. Those recommendations will define broad locations for renewable energy development.

(b) Set out criteria, model policies, relevant case studies and examples of good practice, appropriate to each level of the planning framework - to help local authorities select suitable sites and support applications for development.

(c) Consider what flagship or community led projects might be supported, and in what locations, as exemplars of good or innovative practice that might be replicated elsewhere in the region.

5. EXPECTED OUTPUTS

5.1 We will expect to see the study benefit strongly from the work, experience and conclusions derived from recently completed assessment studies in other regions, and to take the opportunity to consider cross- regional links and compatabilities.

5.2 Required outputs as the study progresses will include the provision of written draft reports for each key stage, as set out in section 6 of the study brief, to both the steering group and wider reference group. The draft reports will include progress and conclusions on:

- Objectively derived assessments of existing and potential renewable energy capacities;
- recommended targets and sub targets;
- broad locations and criteria for the delivery of the key elements;
- criteria, model policies, relevant case studies and examples of good practise to help the selection and acceptance of suitable sites;
- an action plan with priorities for implementing study recommendations, and
- indicators and profiles to assess future performance at all levels across the planning framework.

5.3 In addition to these deliverables the Consultants will be expected to provide:

- A written progress report for each steering group meeting
- Minutes of any meetings, and
- Technical notes as appropriate - including notes and reports on consultations / workshops/ meetings etc.

5.4 Study recommendations must be capable of ownership by stakeholders in the region. They must be in a form that assists the Yorkshire and Humber Assembly and Regional Chamber in reviewing RPG and RSDF, and contributes to greater public familiarity with and acceptance of prospective renewable energy development. Outputs must be in a format suitable for placing on the GOYH web-site to facilitate widest possible public access.

5.5 On completion of the study, and achievement of its objectives, the results should be drawn together into the following final products:

(a) A single information resource containing all the data fields described above, constructed in a way that allows for its further updating and development and its use by the Y&H RA and RC and local authorities in their plans and guidance. Ideally this would take the form of a GIS, but this may be dependent on the level of available funding.
(b) A final report which describes the process of the Study, the results and their implications. The report will make recommendations to the Steering Group on the most appropriate renewable energy targets for the region and how they should be delivered. It should be set out in a way that lends itself to use in the context of reviewing RPG and development plan preparations, in the development control process and in the updating of the Regional Sustainable Development Framework.
(c) 50 copies of the final reports will be required in both hard copy and electronic form for dissemination within the region.
(d) The preparation and presentation of material to showcase the results of this study at a subsequent regional launch event for the study results.

6. ORGANISATION OF THE STUDY

6.1 A large number of organisations have an interest in the development of renewable energy and its effects on the region. The Government Office for Yorkshire and The Humber requires that this Study be undertaken in an inclusive and participatory manner, with the aim of achieving a consensus view if at all possible.

6.2 The study will be steered by a small Steering Group to assist in managing the study, monitoring progress and commenting on proposed outputs. This will include representatives from Yorkshire Forward, Yorkshire and Humber Assembly, Environment and Countryside Agencies, and from business, the renewables sector, local authorities and the environmental sector. The role of the steering group will be to advise on and help facilitate the development of the study working under the direction of GOYH.

6.3 The Steering group will:

- Agree the principles on which the Study will be undertaken (and in particular will attempt to reach a consensus on the principles underlying the assessment of landscape value);

- Oversee the process of selecting and appointing a team to undertake this Study;
- Discuss the Study Brief and possible refinements with the selected team prior to work commencing;
- Oversee progress on the Study, with regular (specified) meetings with the Study Team;
- Receive and discuss with the Study Team the draft and final results of the Study and its conclusions.

It will maintain a close and involved relationship with the Study Team throughout the exercise, and will agree the methodologies to be employed before commencement of each area of Study.

6.4 The Government Office also has a number of 'quasi judicial' roles which could come into play within the land use planning process which may require a degree of detachment at certain stages of the Study's preparation and finalisation and conclusions.

6.5 The recommendations and conclusions in the final study report would be those of the Consultants, but should reflect as far as possible, the views of the steering group.

7. A WIDER REFERENCE GROUP OF STAKEHOLDERS / REGIONAL PARTNERS.

7.1 The study must have to have a wide regional ownership, and produce a greater public understanding and acceptance of renewable energy developments. This means that it must maintain good links with a wide group of regional stakeholders and interested parties, including government and non-governmental organisations, environmental and business groups. A suggested list of those key and interested parties that will form a wider reference group includes:

All the Local Authorities and the two National Park Authorities
Yorkshire and Humber Assembly
British Wind Energy Association
The Countryside Agency
CPRE
Country Landowners Association
Civic Trusts
Council for National Parks
Environment Agency
English Heritage
English Nature
DEFRA (ex MAFF)
Friends of the Earth
Forestry Commission
First Renewables
Green peace
Groundwork Trusts
Going for Green
MOD Defence Estates
National Wind Power
National Farmers Union
National Trust

Regional Energy Forum (led by YF)
RSPB
The Universities
Yorkshire Wildlife Trust
Yorkshire Water
Yorkshire Electricity
Yorkshire Forward
Yorwaste.

Tenderers are invited to suggest any additional technical / regional groups or bodies that should be included here.

8. PROPOSED TIMETABLE

8.1 The closing date for Tenders will be Tuesday 14 August with interviews of short-listed candidates on 20 August. It is anticipated that work will commence in late August, with the study being completed by the end of February 2002. There may be the possibility of follow on work resulting from the study's conclusions, as the Government Office look to encourage the study results to be taken forward and delivered.

8.2 A suggested timetable would be:

- Early Sept : Inception meeting with Consultants and Steering Group to confirm study brief and immediate work programme
- End Sept/Early Oct : initial regional capacity work – including possible discussions with key individual regional stakeholders to collect info / agree definitions/ secure understanding and ownership.
- Mid Oct : meeting with steering group – progress report
- End Oct : preparation of draft report on capacities
- Early Nov : stakeholders meeting (4: one for each sub region) to discuss / build on initial appraisal work
- End Nov : steering group meeting – progress report and conclusions from Stakeholders meetings.
- Mid Dec : preparation of draft final report
- End Jan : steering group meeting to discuss report
- Mid Jan : 2nd Stakeholder meeting – probably a single meeting covering all region, to consider the final report's conclusions and recommendations.
- Early Feb : final report to steering group.

8.3 There will additionally be a major regional launch event following the presentation of the final report to showcase, promote and disseminate the final report within the region – possibly focused on councillors and decision-takers given the objectives of the study.

8.4 Bids will be expected to set out Consultants views on this indicative timetable, including their proposals on the nature and timing of suggested reports, and any proposals for the inclusion of additional/ wider public involvement in the study process, and be prepared to discuss this further at interview.

ANNEX B1 RESOURCE DATA & APPROACHES TO ESTIMATION

WIND ENERGY

Offshore Wind

Offshore wind development – available information
A major difference for estimating the wind energy resource on and offshore is that there is extensive experience of and available information on UK onshore wind. This covers: wind speeds, land cover (settlement, woodland etc), designated areas, capital and operational costs. These data are also available in digital form and can be analysed using sophisticated Geographic Information Systems (GIS). In contrast, there is almost no recorded offshore wind speed data (as a result the data from models is likely to be relatively inaccurate) and only one UK offshore wind farm is operational. While some information on constraints (e.g. competing uses such as shipping lanes, aggregate dredging, fishing, etc.) is obtainable it is less standardised and is not available in detail in GIS form for this study.

The UK national offshore resource estimation is currently based on the Joule funded study by Garrad Hassan, "Offshore Wind Energy in the EC"[1] (Joule 1: Jour 0072). For each country, including the UK, this report categorised the area available for the deployment of offshore wind energy by wind speed, water depth and distance from land.

The wind speed data were derived from information supplied by Deutscher Wetterdienst - Seewetteramt (the German Meteorological Service) using figures from the voluntary observer fleet corrected for coastal effects using WASP (an established wind speed model). A grid resolution of approximately 2km was used. The study assumed that turbines had a hub height (above mean sea level) of 60m and a nominal installation capacity of 6MW/sq km. The UK resource figures assume a much higher turbine density of 15.12MW/sq km.

Unfortunately the European report gives resource data for the whole of the UK and it is not possible to use it directly to derive the regional resource. It does include a map which suggests that there is potential resource within Yorkshire and the Humber coastal waters.

The wind turbines used offshore are likely to be bigger than used on land for a number of reasons:

- It is cheaper, both for installation and operation, to have a smaller number of larger turbines offshore than more, smaller turbines;
- Away from the coastline visual impact will be less, so larger turbines run less risk of being dominating features than on land;
- Noise is likely to be less of a constraint than onshore.

The wind farms are likely to use 2MW wind turbines or larger. 2MW turbines typically have rotor diameters of 70 to 80m with hub heights (above mean sea level) of between 60

[1] Also published by the DTI's RE Programme as W/35/00250/REP/1 Volume 1: Offshore wind energy potential in the EC.

and 100m. Turbines with a rated power output of 2.5MW and even 5MW are in development and may be used offshore before 2010.

Factors which influence the feasibility of developing the offshore wind resource
The factors include:

- The status of the electricity transmission network - is new generation encouraged or discouraged?
- The density of offshore oil and gas facilities
- The sea depth relatively close to shore (within 20km). (Generally speaking it is cheaper and lower risk to build in shallow water and the first developments are likely to be in water depths of 10m or less. Also, while it is cheaper to build near shore the visual and noise impact of wind farms decrease with distance offshore and wind speed increases so shallow water further from land may be attractive.)
- The tidal range
- How much of the adjacent coastline is designated as Heritage Coast or Areas of Outstanding Natural Beauty (AONBs).
- The offshore wind speeds
- The number of electrical substations near to the coast
- Access to ports with good facilities
- Volume of shipping
- Fishing activity
- Aggregate dredging
- MOD use
- Sea bed conditions
- Wave conditions
- Density of coastal SSSIs and RAMSARs.

Offshore wind and local planning authorities
The consents procedure for offshore wind development is not yet finalised. However, as the wind farms will generally be beyond the low water mark it is known local planning authorities will be consultees rather than the determining authority. All wind farms need to be connected to the electricity network and will therefore have to apply for planning permission for the grid connection – electrical substation, and transmission lines. So planning authorities will be involved indirectly and directly in the consents process for offshore wind.

Estimating the resource
Only one offshore wind farm has been built in the UK and this is very close to shore (2km). Experience elsewhere in the world is also limited – offshore development has been limited to Europe, again close to shore and in less demanding sea conditions (e.g. the Baltic). The risks and uncertainties in obtaining consents and in building and operating the wind farms are considerable. Therefore it is difficult to estimate the resource with any absolute confidence.

Crown Estate pre-lease agreements

The area immediately offshore (within 12 nautical miles (approximately 22km) of the low water mark) is owned by Crown Estate. In the first instance offshore wind farms are likely to be built in this area and therefore require leases from Crown Estate. In April 2001 Crown Estate announced the details of developers who had been successful in securing pre-lease agreements for 18 sites around the UK. None of these are off the coast of Yorkshire and the Humber.

Crown Estate allow three years to obtain necessary consents prior to assigning a lease. Once the lease is assigned the site should be operational within two years of that date or the lease is withdrawn. So the first group of wind farms should be operational by 2006.

Estimating the resource

There are some features which make the region particularly attractive for offshore wind development:

- There are several high voltage sub-stations at or near the coast.
- There is access to good ports (on the river Humber.)

However these appear to be outweighed by several disadvantages, viz:

- The sea bed shelves relatively steeply, giving shallow water only close to the shoreline. (though this is less true further south, off the Humber coast)
- The region is an area of low opportunity for connection of new generation
- Much of the region's coastline is designated as Heritage Coast.

This is reflected in the fact that none of the sites with Crown Estates pre-lease agreements are in the region.

Though it seems likely that no wind farms in the region will be built in the 'first wave' of offshore development (which will be those with pre-lease agreements), we estimate that it is possible that one may be built after this, but before 2010.

Crown Estate has placed a limit on the maximum number of turbines per site (30) and the size of the site ($10km^2$) rather than the installed capacity. Assuming this restriction continues, and that turbines are in the size range of 2MW to 5MW, a single farm may have a capacity of 60-100MW. This gives a regional resource estimate for 2010 of between 0-100MW. Annual mean wind speeds at hub height offshore are expected to be in the range of 8 to 9 m/s giving a capacity factor of around 35%. So the corresponding estimate of energy resource is 0- 307GWh/y. A wind farm is most likely to be to the south of the region – off the Humber coast.

Looking beyond this timescale, estimates of resource become more speculative. If technology develops which is cost-effective in deeper water the region may become a more attractive area for offshore development. There could be potential for another three farms to be built. Alternatively none may go ahead. Thus by 2020 the resource may be in the range 0-400MW with an energy output of 0-1226GWh/y. This resource may be more evenly spread between North Yorkshire and the Humber.

Grid-connected wind energy resource – windfarms

Estimating wind resource is not a precise art – wind energy deployment is influenced by a number of variables. Some are obvious and quantifiable: energy output is very dependent on wind speed; there are places where it is not physically advisable to put wind turbines. Others are more complex but could be taken into account if information were available – for example the ease of connection to the electricity network. Finally, there are factors which are more subjective - in terms of visual impact, where is it acceptable to put wind farms? To try to address some of these issues a number of different approaches have been taken to give a range of estimates.

All these approaches have built on that developed by AEA Technology (ETSU) to estimate the UK wind resource[2]. This takes a hierarchical approach to the resource – unsuitable areas are gradually eliminated. The significant definitions of resource for this study are:

- *Feasible* – only areas where it is reasonable to physically site a turbine are considered. That is, areas in and close to woodland, towns, roads etc are excluded.
- *Accessible* – only areas where it is environmentally acceptable to site wind farms are included, i.e. designated areas are excluded.
- *Practicable* – wind turbines are grouped into farms, in areas with wind speed estimates above a threshold value, whose size and spacing is determined by economics and environmental acceptability.

More details of the resource estimate methodologies are shown within the following notes.

All the methods use a Geographic Information System (GIS) to handle the large quantities of data. The resolution of the data used was 1 square km to match that of the database of estimated wind speeds.

General changes to existing UK wind resource approach – increasing the turbine size
The last major revision of our method for estimating wind resource took place in 1996. At that point most new turbines being installed were 600kW in size so the resource was estimated using 600kW turbines. Wind technology has moved on since then - generally larger turbines are more cost-effective and a turbine size of 1.5MW is now more typical. This is considerably physically larger, with a rotor diameter of 66m (as against 42m for the 600kW turbine) and a hub height of between 60 and 70m (as against 40 and 50m for the 600kW turbine). The turbine density (number of turbines per square km) thus changes from 15 600kW turbines to 6 1.5MW turbines. Overall this has no net effect – the overall maximum capacity density per square km remains the same at 9MW.

However, wind speed generally increases with height above ground level and we have allowed for this by assuming an across the board increase in wind speed of 5%. This is reasonable overall but will be inaccurate for particular sites – at some the wind speed increase will be less, at others more. This means that the errors in the estimated energy will be greater than that in the more systematic national approach where the hub height of the turbine matched the height above ground level of the wind speed data (45m).

[2] For a full description of this see 'A review of the UK onshore wind energy resource', ETSU-R-99, F Brocklehurst available from the Renewable Energy Enquiries Bureau

First approach – standard UK methodology

The first and most obvious estimate is the UK "base case" practicable resource (i.e. already clustered into wind farms a given distance apart). This approach implies that there are no wind farms in nationally designated areas, and that the centres of the wind farms are at least 7km apart. The sub-regional boundaries for Yorkshire and the Humber are applied and the figures are adjusted for turbine size as described above. The results are shown in Table 1 below. The greatest resource is in North Yorkshire, followed by Humber with a little in West Yorkshire. Under these conditions there is no wind resource exploited in South Yorkshire.

Table 1 – "Base case" practicable resource estimates

Sub-region	No. of farms	No. of turbines	Installed capacity (MW)	Average farm size (turbines)	Annual energy output (GWh)
Humber	8	150	225	18.8	615
North Yorkshire	11	187	280.5	17.0	796
South Yorkshire	0	0	0	N/A	0
West Yorkshire	2	38	57	19.0	175
Total	**21**	**375**	**562.5**		**1586**

Second approach – greater minimum separation of wind farms

It is possible that the standard methodology overestimates the number of wind farms that are acceptable. One of the variations run as part of the national assessment used a minimum wind farm centroid separation distance of 15km – more than twice the standard value (7km). Adjusting the data to allow variation of this parameter (again adjusting for turbine size) gives the results shown in Table 2 below. The resource is about 60% of that with more closely packed wind farms shown above. The distribution between the sub-regions is similar to the base case with greatest resource in North Yorkshire, followed by Humber, with some in West Yorkshire (this is unaffected by the increased separation distance).

Table 2 - Practicable resource estimates with windfarm minimum separation increased to 15km

Sub-region	No. of farms	No. of turbines	Installed capacity (MW)	Average farm size (turbines)	Annual energy output (GWh)
Humber	5	77	115.5	15.4	301
North Yorkshire	6	104	156	17.3	440
South Yorkshire	0	0	0	N/A	0
West Yorkshire	2	38	57	19.0	175
Total	**13**	**219**	**328.5**		**917**

Third approach – smaller wind farms allowed

It may be that smaller wind farms become increasingly economic. One scenario used in national resource estimates was a minimum wind farm capacity of 6MW (i.e. 4*1.5MW turbines) and the results of this are shown in Table 3 below. Reducing the minimum farm size in this way identifies additional resource. It increases the number of farms by about 40%, although increasing the capacity and energy only by about 20%. It also increases the geographic spread of the resource a little, introducing one wind farm in South Yorkshire. However, the pattern of distribution of the resource remains very similar with North

Yorkshire with the largest resource, followed by Humber, and West and South Yorkshire making only minor contributions.

Table 3 - Practicable resource estimates with minimum farm capacity of 6MW

Sub-region	No of farms	No of turbines	Installed capacity (MW)	Average farm size (turbines)	Annual energy output (GWh)
Humber	15	223	334.5	14.9	894
North Yorkshire	12	199	298.5	16.6	839
South Yorkshire	1	5	7.5	5.0	18
West Yorkshire	2	38	57	19.0	175
Total	**30**	**465**	**697.5**		**1927**

Discussion of results

The estimates of wind resource shown above understandably vary considerably. It is important to recognise that none of them take account of the restrictions due to the electricity network or which may be applied by the MOD[3] – this was because no data is readily accessible on these issues. Both of these issues are likely to restrict the resource further, particularly in the short term. Also, no general 'top down' approach will ever match the wind farms which may actually be built. There are too many site-specific features which such a method cannot take into account. However, the estimates can give a range of what may be possible.

A specific point worthy of note in these results is the low level of wind resource exploited within South Yorkshire. It should be stressed that these results are only indicative of the possibilities under the assumptions that we have made, and cannot be said to be predictive of what will actually happen.

This exercise has particularly shown the effect on potential wind schemes of different ways of modelling resource. As might be expected, the further apart the wind farms are constrained to be, the smaller the resource, and if smaller wind farms are allowed, the resource is greater.

Wind speeds generally increase with height above sea level. Much of the high land areas in the region are designated (either as National Park or Area of Outstanding Beauty) and thus excluded from the practicable resource in these estimates. A change to this assumption could clearly have a major influence upon the potential resource. The remaining high wind speed areas in the region are concentrated along ridges in Humber and North Yorkshire. This arrangement of wind farms along lines of high ground means that the size of the resource is particularly affected by increasing the minimum separation distance of farms.

Depending on the assumptions the analysis suggests the practicable resource in the region might be between 13 and 30 wind farms, with an installed capacity of between 330 and 700MW, and with an implied energy output of between 900 and 1900GWh/y.

[3] for training areas, low fly zones, radar installations etc

These estimates give a large range and cover a broad range of circumstances. One could postulate that the importance of climate change amelioration measures - and therefore the overall acceptability of wind farms - would increase with time, although this remains to be seen. In broad terms, it may be that the exploited wind energy resource is closer to the low end of the range in the medium term (to 2010) and the higher end in the longer term (2020).

These initial estimates can be compared with the BWEA's estimate of wind energy within Yorkshire and the Humber by 2010[4], a figure of 196.5MW. These figures form the context within which "consultation targets" for wind energy across Yorkshire and the Humber can be developed.

Single turbines providing on-site power

In addition to wind farms wind energy can make a contribution on a smaller scale – providing additional power to individual businesses, schools etc.

Large turbines supplying large commercial or industrial sites
The chief restrictions on siting large turbines 'on site' will be space and cost - these are considered below. There is a wide range of turbine size available and the physical size depends on the power. The power rating (or installed capacity) of a turbine increases with the area swept by its rotor, which increases with the square of the rotor diameter. The tower height increases with the rotor diameter and for large turbines is generally roughly the same as the diameter.

Space to site a wind turbine
The key points when considering the space needed for a turbine are the noise impact and the need to be out of the wind shadow of obstacles.

- Turbines are generally sited so that they can't be heard inside domestic dwellings most of the time. This means that in most circumstances they need to be a few hundred metres away from the nearest house. Points to consider are:
  - The audibility of the turbines varies with wind speed and depends on the background noise. Background noise is generally higher in urban areas than rural areas;
  - Different turbines generate different amounts of noise. Generally bigger turbines generate more noise but the noise is not in direct proportion to the turbine power, i.e. a turbine which is twice the size is not necessarily twice as noisy.
- Turbines have to be sited away from buildings or other obstacles to be clear of their "wind shadow". In the shadow of an obstacle the wind speed is reduced, cutting down the energy available, but also the turbulence of the wind is increased. High turbulence can mean that turbines fail to operate properly and that they wear more quickly. To a limited extent it may be possible to move a turbine rotor out of a wind shadow by increasing the tower height. However this will increase both visual impact and cost.

[4] "Planning for Wind Energy – A Guide to Regional Targets", BWEA (2000)

Other considerations important for siting include:

- appearance/visual impact
- interference with electromagnetic signals (telecom, radio, TV etc)
- safety (though this should usually be taken care of by the noise and wind considerations mentioned above)
- grid connection
- infrastructure (roads etc)
- ground conditions

Cost of energy from a wind turbine

Cost depends on energy output (which depends on the wind speed), and the capital cost.

- For a given turbine the energy output is very dependent on the wind speed – the higher the wind speed the greater the output and the cheaper the power. Wind speeds in the region are generally good but vary considerably, mostly due to local terrain.
- The cost per kW installed is generally greater for smaller turbines, sometimes by a significant margin. This is due to two factors: the cost per kW of the turbine itself is higher and the costs of developing and installing a project are largely independent of the size of the turbine. So for a larger turbine these costs are proportionately lower.

Output from a wind turbine could be sold to a single customer. If the customer is close to the turbine they could be connected by a dedicated cable (known as 'private wires'). Otherwise the connection can be via the grid. Examples of organisations that might be able interested in buying their power from wind are large hotels, supermarkets, factories, tourist attractions, or local government. Businesses can use their green supply as a marketing feature to distinguish them from competitors and demonstrate their concern for the environment.

If the power is supplied to a single customer or sold to an electricity supply company the turbine's output will have two price advantages over 'brown' (conventional) power:

- it will be exempt from the Climate Change Levy of 0.43p/kWh (although this is only relevant if the power is sold to a non-domestic customer);
- when the Renewable Obligation is introduced (now expected to be January 2002), it will be issued with a Renewable Obligation Certificate (ROC) for the output which is expected to be worth up to 3p/kWh;

It should be noted that if the power is simply used on-site and not sold to a supplier the output is not eligible for ROCs.

Wind energy is expected to become more cost-effective with time. Firstly the cost of energy from wind is expected to decrease due to an increased market (economies of scale) and increases in efficiency. (These effects have already reduced costs considerably). Secondly the cost of energy from conventional sources (coal, gas etc) can be expected to increase (due to emissions trading/carbon taxes, increased fuel prices etc). Also, as use of wind becomes more routine the infrastructure should develop to make installing and operating such a system much easier. Therefore the market could increase considerably from the medium (2010) to the longer term (2020).

Nevertheless, it is difficult to estimate the contribution that large, single distributed wind turbines could make to the deployable resource. Clearly there are an enormous number of businesses and farms in the region, a fraction of which will have space suitable for a wind turbine and a wind speed that is sufficiently high to make it economic. Of these not all will have the interest or the means to install a turbine. Therefore a robust estimate of this resource is not possible in the absence of detailed data on the number of large electricity users. A first estimate of the resource by 2010 would be 100 organisations installing turbines of this type, with an average capacity of 30kW, i.e. a total capacity of around 3MW. This might generate about 6.5GWh of electricity per year. By 2020 this could increase to - say - 250 organisations, giving a total capacity of 7.5MW, with an implied energy output of 165GWh per year.

Smaller grid-connected turbines

Small turbines are available in a range from a few watts to 10 kW. These 'domestic sized' grid-connected wind turbines, are obviously less demanding in terms of space and infrastructure than the larger turbines. They can be accommodated in the grounds of a school or possibly in a large garden. One turbine manufacturer has even designed a 2.5kW turbine specifically for urban areas[5], with the potential to be integrated into buildings (i.e. mounted on a flat roof).

Unfortunately capital costs are relatively high. Although turbines supplying power to dwellings are available at reduced rate VAT (5%) these are unlikely to be cost-effective in the short term, even with the relatively high wind speeds available in the region, unless 'net metering' is introduced.

Net metering is where the electricity meter 'runs backwards' if power is exported to the network, i.e. the turbine is generating more power than the customer is using. Thus the electricity bill is for the net energy supplied. One supplier, Eastern, has introduced net metering for small PV systems but as far as we are aware none to date have agreed to this arrangement for small wind systems. Net metering is important for both wind and PV because they are intermittent sources of power. Much of the time the demand will not match the electricity generated so without net metering the customer will have to buy electricity (at a high price) at some times and sell it (at a much lower price) at others.

Even with net metering small wind turbines at this scale are unlikely to be money spinners (suppliers are unlikely to be interested in them with regard to the Renewables Obligation), and involve long pay back periods.

Having said that, even in the absence of net metering some organisations may choose to install a wind turbine for its value in other respects. This may be as an educational tool – in schools colleges, museums with an energy or environmental interest, or as a statement of the organisation's 'clean green commitment', or both.

It is difficult to estimate definitively the resource that will result from this type of installation – there is little obvious analysis that can be done. It seems likely that in the short to medium term turbines will be installed more due to the interest of the organisations concerned than for commercial reasons. A preliminary estimate is that by 2010 anything

[5] Lagerwey – the 5/2.5, with a rotor diameter of 5m and a hub height of 12.5m, designed with low noise emissions.

from a few dozen, up to a few hundred systems, with average capacity of 2kW per system, could be installed, giving a resource of between 50kW and 800kW by 2010. This could generate between 0.09GWh and 1.4GWh per year.

In the longer term economics are likely to improve somewhat (though probably to a lesser extent than for larger scale turbines). Also it is thought that distributed small (household) scale generation will become more widespread and therefore net metering more accepted. We estimate that these two effects would increase the resource in the longer term (2020), to between 500kW and 3MW generating between 0.9GWh and 5.2GWh per year.

Off-grid wind energy

The smallest turbines are generally used for off-grid applications – normally charging a battery which then feeds power to the application. Alternatively many homes which are not grid-connected are powered by diesel generators. Adding a wind turbine to these 'mini-grids' can considerably reduce running costs and noise (from the diesel generator. For examples see[6]) and offer reasonable paybacks. Turbines in the range 2 to 6kW are a suitable size for this. Many houses which are off-grid are remote, will have space to site a turbine and are likely to be suitable. If figures were available for the number of homes without grid connection it would be possible to make a reasonable estimate of this aspect of the resource. Assuming two hundred suitable properties with an average capacity of 2.5kW give a resource of 0.5MW, generating around 0.9GWh/y by 2010. This resource is dictated by the number of non-grid connected homes so it is likely to be the same on a longer time scale (to 2020).

A wide range of other off-grid applications including new street lamps, bus shelter lights, traffic warning signs, and telecommunications[7] exists. Generally off-grid applications are powered by hybrid systems – a combination of wind and PV with a battery. Most of these systems are smaller than for domestic supply – a few hundred watts or less, so while there is potential for a few hundred to a few thousand of them to be installed they will only make a small contribution in terms of installed power – the resource may be from 50kW to 400kW, generating around 0.09GWh/y to 0.7GWh/y by 2010.

In many circumstances renewable sources (wind alone, or hybrid) are already cost competitive with alternative off-grid generation – batteries alone and/or diesel generation. Thus it is likely that the resource won't increase massively in the longer term, even though costs are likely to decrease. In 2020 the resource may be from 100kW to 800kW, generating around 0.18GWh/y to 1.4GWh/y.

[6] See Renewable Energy Programme Extended Case study 10 Wind small scale applications and Extended case study 12 Wind small scale applications – remote farms and dwellings available from the Renewable Energy Enquiries Bureau

[7] See Renewable Energy Programme Extended case study 20 – transport applications, Extended case study 21 – remote monitoring applications, Extended case study 22 – outdoor leisure facilities, Extended case study 23 –water management applications available from the Renewable Energy Enquiries Bureau

Notes: Description of methodology used for estimating the wind farm resource

1 Feasible resource

The feasible resource is that with the whole area excluding:

- areas unsuitable for development for physical reasons (settlements, woods, water, roads beach, etc) excluded
- 100 m buffer zones around roads, rivers, railways and canals (100m chosen for safety)
- 400 m buffer zones around towns and other settlements (400m chosen so that noise levels at nearest dwelling likely to be acceptable. It is not possible to take account of each individual building as they are too numerous and it is impossible to distinguish between housing and other buildings (barns etc)
- 6 km buffer zones around airports (6km is chosen as a reasonable clearance for radar)

As described in the main text, the remaining area is populated with wind turbines at a maximum density of 9MW/square km to derive the feasible resource. The wind speeds used are the estimates at 45m above ground level from the UK wind speed database[8]. The database has a value for every square km of the UK.

2 Accessible resource

The accessible resource is as the feasible resource but excluding nationally designated areas. For England these are:

- National Parks
- Areas of Outstanding Natural Beauty
- National Nature Reserves
- Sites of Special Scientific Interest
- Greenbelt

3 Practicable resource – grouping turbines into windfarms

The practicable resource attempts to turn the accessible resource into something more meaningful. Energy output from turbines increases steeply with wind speed, so low wind speed sites are much less cost-effective. The first step therefore is to eliminate areas with an estimated annual mean wind (AMWS) of >7 m/s @ 45m above ground level.

Next, the wind turbines in the remaining areas are clustered into windfarms, with a given minimum and maximum number of turbines in each farm and a minimum separation between the wind farm centres. The values chosen for the base case were:

- Minimum farm size, 20 600kW turbines (capacity equivalent to 8 1.5MW turbines)
- Maximum farm size 50 600kW turbines (capacity equivalent to 20 1.5MW turbines)
- Minimum farm centroid separation, 7km.

[8] See report 'Computer modelling of the UK wind energy resource: UK wind speed data package and user manual' AEA Industrial Technology, Harwell, ETSU WN 7056 for details.

A numbers of variations on these figures were made including increasing the minimum windfarm separation to 15km and reducing the minimum farm size to 10 600kW turbines (capacity equivalent to 4 1.5MW turbines).

ENERGY FROM WOOD AND OTHER BIOMASS SOURCES

Tables 5 and 6 below show our estimates of actual and prospective biomass arising from forestry and energy crop sources, and from other farm residues[9], across Yorkshire and the Humber, using a Geographical Information System (GIS) approach (described further below). Table 5 shows how the various resources can be augmented by the assumption of "collection radii", which represent "economic distances" over which additional resource - potentially from outside of the regions' borders - may be transported for utilisation within the region. This is in some ways a more realistic view of the utilisable resource than the figures shown within Table 6, which simply includes all resources arising within the regional and sub-regional boundaries across the region.

The potential regional resources available from new growth of short rotation coppice (SRC) are very large as implied within Tables 5 and 6. The exploitability of this SRC potential must however be viewed as more uncertain than other wood resources given the widespread agricultural diversification required to provide it. We discuss scenarios for the potential regional uptake of SRC in Volume I of this report.

The available forestry wood resources could be augmented by additional types of resource from across the region, namely:

- Primary wood processing
- Arboriculture
- Industrial sources

Although data for these sources are not held within our GIS, we have attempted to estimate the possible quantities of each of these sources that might arise across the region. Table 4 shows this information.

Table 4 – Estimates of wood resources currently arising across Yorkshire and the Humber

Source	Quantity (oven-dry tonnes / year)
Existing forestry (from Table 6)	45,370
Primary wood processing	18 - 40,000
Arboriculture	37 – 52,000
Industrial wood sources	20 – 78,000
TOTAL	**120 – 215,000**

[9] Defined as follows: Broiler – Intensively-reared chickens, generating litter for combustion / Pig – Manure arising from housed pigs, used for anaerobic digestion / Fowl – Housed chickens, the manure from which can be used for anaerobic digestion

Table 5 - YORKSHIRE & THE HUMBER REGIONAL BIOMASS RESOURCES - Augmented by collection radii

Sub-Region	Farm Livestock Wastes (odt/y)			Straw (t/y)	Existing Wood (t/y)	SRC (t/y)
	Broiler	Fowl	Pig			
North Yorkshire	187,907	65,938	262,998	1,065,818	73,486	8,939,710
South Yorkshire	99,855	57,748	124,238	756,725	38,099	4,862,300
West Yorkshire	120,131	51,971	149,237	560,513	37,438	5,383,830
Humber	163,402	57,520	211,362	1,296,547	48,611	5,610,620
Yorkshire & the Humber (TOTAL)	**280,341**	**117,868**	**328,903**	**1,652,534**	**100,442**	**11,801,350**

Table 6 - YORKSHIRE & THE HUMBER REGIONAL BIOMASS RESOURCES

Sub-Region	Farm Livestock Wastes (odt/y)			Straw (t/y)	Existing Wood (t/y)	SRC (t/y)
	Broiler	Fowl	Pig			
North Yorkshire	77,174	19,434	105,910	365,484	33,042	3,463,950
South Yorkshire	4,148	3,606	9,931	60,750	3,137	538,430
West Yorkshire	19,936	10,639	18,168	97,798	3,951	1,216,810
Humber	41,887	5,525	95,521	410,028	5,240	593,670
Yorkshire & the Humber (TOTAL)	**143,152**	**39,206**	**229,540**	**934,182**	**45,370**	**5,813,995**

ODT ≡ Oven-Dry Tonnes

SRC/Wood: ~5,000 odt/y ≡ 1 MW_e *Straw: ~4,300 odt/y ≡ 1 MW_e* *Farm Livestock Wastes: 14,000 odt/y ≡ 1 MW_e*

A “collection radius” of 40km is applied within Table 5 to dry feedstocks, whilst a “collection radius” of 10km is applied to wet feedstocks

Assuming that 5,000 oven-dry tonnes / year (odt/yr) of wood fuel are required to fuel 1MW of electricity generating plant, this equates to around 24-43MW of nominal electricity generating capacity, exclusive of any additional resources that might be obtained from SRC deployment. This data was used to derive estimates for the consultation process. Volume I of this Report discusses how these resources might be deployed within Yorkshire and the Humber under different scenario assumptions.

Notes – Description of Geographical Information System

A GIS (Geographical Information System) is a computer-based tool that manipulates spatial datasets (such as soil type, climate and topography) to derive map-based information. "Spatial" in this context means that the data describes entities and phenomena that are located geographically; datasets are collections of geo-referenced data. These tools are particularly useful for renewables (e.g. biomass), where geographical location strongly influences both the size of the resource (e.g. in terms of crop yields) and the ability to access and exploit it.

Resource mapping and analysis can include all of the following factors:

- Location of the basic resource (fixed for some resources such as wind and farm livestock waste, variable for others such as Short Rotation Coppice);
- Physical and practical constraints on our ability to harness it;
- Environmental and regulatory restrictions on its development;
- Economic considerations.

SOLAR ENERGY TECHNOLOGIES

The Solar Resource

The Sun's energy arrives at the Earth's surface either as 'direct', from the Sun's beam, or 'diffuse' from clouds and sky. The total or 'global' irradiation is the sum of these two components and, across the UK, the daily annual mean varies between 2.2kWh/m^2 to 3.0kWh/m^2 as measured on the horizontal plane. There is a very significant variation around average values due to both seasonal and daily weather patterns. ***The Yorkshire and Humber region has a mean solar irradiation of about 2.5kWh/m^2 per day, with a peak of about 5.1kWh/m^2.day in June and a minimum of about 0.5kWh/m^2.day in January.***

There are three main technologies that can directly exploit the solar resource:
- Passive Solar Design (PSD) - use of solar energy for lighting, heating & ventilation.
- Photovoltaics (PV)- direct conversion of solar energy into electricity.
- Active Solar Heating (ASH) - direct conversion of solar energy into stored heat.

Passive Solar Design

Passive solar design (PSD) is a mature technology where solar energy is deliberately used in building design to provide some of the heating and lighting and to assist natural ventilation. An integrated approach to building design carefully balances the benefits and conflicts of PSD and energy efficiency to optimise the total energy consumption of the

building whilst maintaining acceptable levels of comfort for the occupants. In theory PSD displaces other energy sources, such as electricity, gas or oil etc., used for lighting, heating and ventilation, but can – if not applied correctly - also increase energy consumption i.e. due to the need for air-conditioning to reduce overheating arising from high glazing proportions.

Application of PSD

The market for PSD can be subdivided into four categories:

- New-Build/Housing
- New-Build/Non-domestic
- Refurbishment/Housing
- Refurbishment/Non-domestic.

PSD Targets for the Yorkshire and Humber Region

Although PSD is now widely recognised and accepted this does not mean that it is widely practised. The unplanned benefit of solar energy for heating and lighting in UK buildings is estimated to be 145TWh/year. However, the number of buildings that have been deliberately designed to exploit solar energy is very small (a few thousand) when compared to the total UK building stock. It has been estimated that the benefit of deploying PSD in these buildings is equivalent to a saving of 9GWh/year.

The UK building industry is conservative, especially the housebuilding sector. The market for passive solar housing would seem to be less conservative in other countries where a wider variation in design is acceptable and where there is a greater tendency to smaller developments and individual designs.

Design professionals are now increasingly aware of how to better employ daylight and natural ventilation techniques to provide the required conditions in a building while reducing energy demand. Despite the increasing adoption of passive solar techniques in non-domestic buildings, there is a continuously increasing demand for air conditioning, especially in city centre offices. This ‘high energy’ technology is likely to negate the energy savings made in low-energy PSD offices. This trend to increasing application of air conditioning is also occurring internationally as higher standards of comfort are demanded. An assessment of energy use in the building sector shows that overall demand has remained roughly constant over many years - reductions in energy use from energy efficiency measures, including PSD, have been neutralised by the increased demand for comfort levels and increased use of domestic appliances.

To realise energy savings offered by PSD in Yorkshire and Humber the principles will need to be promoted within an overall strategy of measures and targets aimed at reducing net energy demand in buildings.

In the **domestic sector** it is estimated that good PSD practice and orientation could reduce domestic energy requirements - primarily heating load - by between 1-2MWh/yr. This saving is more applicable to the new-build market rather than retro-fit. Based upon historical rates of construction across Yorkshire and the Humber, it is assumed that 15,000

new homes will be built per year to 2010, or 150,000 over the 10-year period. Therefore if all of these new homes were able to achieve these PSD savings, a technical potential energy benefit of 15-30GWh/yr might be available. However it is recognised that the housing construction industry is very conservative in the context of costs and customer perceptions of new technology and little progress has been made in integrating good PSD into new homes over the last 20 years.

The **commercial buildings sector** may, in some cases, offers greater prospects for energy savings from PSD because of increased daytime occupation and the increasing use of air-conditioning. There has been a greater awareness of PSD in this sector and architects have been more able to experiment with day-lighting and natural ventilation. However there are significantly wider variations in potential savings from PSD in this sector, due to the enormous diversity of building types. It is therefore appropriate to consider a much wider range of benefits from PSD in this sector, in the range 3-9kWh/m^2/yr[10].

Appropriate projections of overall possible savings in this sector are made more complex by the absence of firm data for building rates and existing building stock data. Estimates for UK building stock have been made (see Reference above) in order to estimate PSD potential in commercial buildings, which suggest that of the order of 4 million m^2 of floor space might be built or refurbished each year in the public and private commercial sector. If 12% of this figure is located within Yorkshire and the Humber, a technical potential of between 1.4-4.3 GWh/yr for PSD might be available. To assist in achieving a major proportion of this potential, new-build projects should be encouraged to take advantage of the design advice scheme operated under the DEFRA Best Practice Programme. Planners could also impose energy rating targets on developers so that the issue is incorporated into the design discussions with clients early in the concept planning.

Photovoltaics (PV)

PV materials are usually solid-state semi-conductors which generate an electrical potential when exposed to light. The PV material and its electrical contacts are usually referred to as a cell. Cells collected and encapsulated into a standard sealed unit producing a useful voltage and current are termed a module.

For most practical uses some form of energy storage and associated controller are required, or a DC to AC inverter to match with the mains network or AC loads. These “balance of system” (BoS) components include module support structures and cabling as well as all electrical interfacing, batteries and charge control equipment. BoS costs can be as much as 50% of the cost of a turnkey system and cost optimisation is an ongoing development process by manufacturers. Modules have proved to be both reliable and low-maintenance items with a service life of at least 25 years.

Applications for Photovoltaics

Depending on the type, PV modules produce between 50 to 150W_p/m^2. In these assessments PV is assumed to produce 100W_p/m^2, generating an estimated 75kWh per year

[10] These ranges are taken from ETSU R-122 “New and Renewable Energy – Prospects in the UK for the 21st Century: Supporting Analysis” (March 1999)

in the Yorkshire and Humber Region. Therefore a well designed $1kW_p$ system will yield about 750kWh/year.

Building Integration

Over the last decade there has been increasing activity in the field of building-integrated grid-connected PV technology (BIPV). The integration of PV into energy-conscious design strategies could create a new generation of buildings which not only have minimum energy requirements but also produce environmentally benign electricity.

Commercial Buildings

Ideally, PV-generated electricity should be used within the host building where it can directly replace electricity supplied by the utility. The load profiles of many commercial buildings are sufficiently well matched to the electricity output from a PV system to be able to consume all the output from quite large systems. This is because the output from the PV system can be absorbed by daytime demand from electrical services in offices (e.g. lighting, ventilation, computers and office equipment).

Domestic Buildings

In principle, a significant fraction of domestic electricity demand could be met by a PV system, but it is unlikely that the load profile in individual dwellings would be a good match to the PV system output on both a seasonal and daily basis. Distributed domestic PV systems may have greater benefits at an aggregate level. Despite the high costs and limited power match, experience in Europe and USA has shown that significant numbers of home owners are willing to invest in PV technology.

Central generation

At present, PV generation costs are high relative to alternative central generation options. However, PV equipment costs have been reducing steadily over the last ten years, with a significant growth in the size of the market in that time. There are some examples of central PV generation plant in sun-belt regions such as USA, Spain and Italy ranging in size from $1MW_p$ to $5MW_p$. The cost-effectiveness of such plant can become more favourable if moderate size systems can be embedded into local distribution systems close to day-time loads. One possibility that has been exploited in central Europe is the integration of PV systems onto motorway sound barriers - thus exploiting the availability of land, the dual function as a sound-barrier in urban areas, and the presence of local loads.

Remote power supply

PV is a cost-effective remote power supply, where other energy sources are not available or impractical - telecommunications, navigational aids and space satellites have been the biggest applications.

Targets for the Yorkshire and Humber Region

Domestic Buildings

Although domestic electricity loads and PV generation do not match well, there is significant interest in the technology by home-owners. Take-up is growing in Europe particularly where national support programmes are in place (Germany, Japan & USA).

Take-up in the UK has been restricted to a few property owners wanting to show their 'green' credentials. PV prices are slowly reducing, and the VAT reduction announced in a recent budget, has cut the cost of a professional installation by 12%. A $1kW_p$ PV system will cost about £5k - £8k today, but in the longer term there may be cost and market differences between new-build and retro-fit installations that may produce different sales characteristics.

A "business as usual" scenario might predict that the market uptake remains limited, with sporadic investment in both new-build and retro-fit systems, assuming no support mechanisms in either capital investment or electricity output. From this point onwards we propose that this would result in an installation rate of $50kW_p$ per year, continuing to 2010. This expansion should be achievable, at least in the short term, as the DTI's Renewable Energy Programme supports Domestic Field Trials, and other commercial activities (e.g. by Solar Century) creates clusters of new-build and retro-fit installations over the next year or so. After that point cost reductions and public awareness could maintain this growth rate.

This "business as usual" scenario predicts approximately 1500 domestic installations in the Yorkshire and Humber region by 2010. If each system is typically of $1.5kW_p$ these installations would provide a cumulative PV capacity of $2.2MW_p$, generating 1.6GWh/year. Forward projection of this scenario to 2021 predicts $4.6MW_p$ capacity, generating 3.5GWh/year.

If other support mechanisms, such as net-metering and subsidies for capital costs, were to be initiated alongside commercial cost reductions, then take-up could accelerate. It is thought that costs to install PV are less for new-build housing suggesting this sector could grow at a faster rate. Conversely there is significant interest in PV by existing home owners and so retro-fit (including DIY) may emerge as a growth market.

The European Union has an aspiration for the installation of 500,000 PV systems by 2010 (expressed in its' "Campaign for Take-Off" for renewable energy). The UK "share" of this deployment is approximately 70,000 systems nationwide. Assuming that the region's housing stock is 10% of the UK total (21 million), on this basis the region could expect to install 7000 domestic PV systems by 2010 in the achievement of the above target. This rate of deployment, maintained to 2021, would increase the region's domestic PV systems to 14,700 in total.

In this "green future" scenario, if each domestic PV installation was sized at $1.5kW_p$, Yorkshire and the Humber would have installed $10.5MW_p$ of capacity by 2010, generating 7.9GWh/year. Projection forward to 2021 gives $22MW_p$ capacity, generating 16.5GWh/year.

Taking this accelerated rate of deployment much further, we envisage that - by 2010 - planning guidelines will prescribe the use of energy efficiency measures in buildings, including PV installations if cost reductions can be achieved. ***We assume therefore that, in a greatly enhanced view of the "green future" for domestic PV, half of all the new-build domestic stock constructed between 2010 and 2020 has PV installed (assumed to be a maximum since the remaining 50% are over-shaded or not suitably orientated). Adding this rate of uptake to the installations achieved at a lower rate to 2010, the possible***

number of regional domestic PV systems rises to 94,000 by 2021, producing 140MW$_p$ and generating 106GWh/year.

Commercial Buildings

Although this sector is considered to be the first cost-effective market for building integrated PV, the market is yet to expand from the current uptake in high-profile new-build projects supported with national or international funding. Total UK installed capacity in this sector is currently in the region of 500kW$_p$ from about 25 systems.

BP are the biggest installers of PV with project 'Sunflower' that is incorporating PV onto filling station canopies. Yorkshire and the Humber has a small number of commercial building PV systems, most notably the Earth Centre, where 103kW$_p$ is integrated into the entrance canopy.

Data for the commercial building stock in Yorkshire and Humber is not readily available, therefore an accurate estimate of uptake is not possible. Nevertheless projections can be made using the following growth scenarios.

There is an estimated capacity of about 150kW$_p$ of commercial BIPV in the region as at 2000. In a "business as usual" scenario, without significant support mechanisms, we project that there might be an average of two major commercial systems (each of, say, 50kW$_p$) installed per year across the region to 2010. ***This "business as usual" scenario therefore predicts 20 commercial installations giving a total PV capacity of 1.0MW$_p$ and generating 0.75GWh/year. Projecting this scenario further forward to 2021 would imply 2.1MW$_p$ capacity, generating 1.6GWh/year.***

However, in a "green future" scenario, with increased awareness and support for demonstration schemes, take-up could increase at a faster rate. A recent study[11] predicts a national total of 517 commercial PV building projects to 2010 under such a scenario. Using this as a basis, and assuming that the region has 12% of the UK commercial building stock, approximately 62 systems might be installed by 2010. ***If each is about 50kW$_p$ the total capacity would be 3.1MW$_p$, generating 2.3GWh/year. Forward projection of this scenario to 2021 predicts 6.5MW$_p$ capacity, generating 4.9GWh/year.***

Central Generation

The region has a motorway network linking the urban western conurbations, plus a trunk road network feeding the lower populated areas to the east and north of the region. The East-West orientation of some sections of these motorways, as well as other busy trunk roads, provide an option for South facing sound-barriers - the best orientation for maximum output from PV modules. Whilst it is difficult, at present, to develop a rationale for the ownership and implementation of such embedded generation schemes it is useful to indicate the potential for the application. The opening of electricity markets, the possibility of net-metering for embedded generation and reductions in PV costs could, when combined with the dual function of the application, make such systems viable.

Whilst there are difficulties in accurately predicting the growth of this area, we propose that in a "green future" scenario the region could install about 2.4MW$_p$ of this form of

[11] ETSU S/P2/00279/REP – "The Value of Electricity Generated From PV Power Systems in Buildings", Ecotec (1998)

central generation by 2010. This would represent 15km of "PV sound barrier" along motorways and trunk roads, providing an electricity yield of 1.8GWh/year.

We project that this scenario could continue to 2021, resulting in a cumulative installed capacity of 6.4MW$_p$ from 40km of "PV sound barrier", generating 4.8GWh/year.

Table 7 - Summary of PV installations by 2010 – 'Business as Usual' scenarios

	2010			**2021**		
	Installations	Total capacity MW_p	Energy GWh/year	Installations	Total capacity MW_p	Energy GWh/year
Central Generation	0	0	0	0	0	0
Commercial buildings	20	1	0.75	42	2.1	1.6
Domestic buildings	1500	2.25	1.6	3100	4.6	3.5
TOTAL	**1520**	**3.25**	**2.35**	**3142**	**6.7**	**5.1**

Table 8 - Summary of PV installations by 2010 – 'Green Future' scenarios

	2010			**2021**		
	Installations 2010	Total capacity MW_p	Energy GWh/year	Installations 2021	Total capacity MW_p	Energy GWh/year
Central Generation	15	2.4	1.8	40	6.4	4.8
Commercial buildings	62	3.1	2.3	130	6.5	4.9
Domestic buildings	7000	10.5	7.9	*14700 - 95000	22 - 142	16 - 106
TOTAL	**7077**	**16**	**12**	**15k – 95k**	**35 - 155**	**26 - 115**

*Lower figure based on a projection of the UK and regional share of the EU's 500,000 roofs target; upper figure based on 50% of new-build from 2010 onwards

Active Solar Heating (ASH)

Active solar collectors convert solar irradiation directly into heat, usually in the form of hot water. Solar collectors fall into two basic categories.

- The flat plate collector has a blackened surface, called the absorber plate, which absorbs the incident solar energy. The energy is then transferred, as heat, to the fluid which usually flows through pipes connected to the plate, and then back to the tank. To reduce heat loss there is usually a glass cover on top and some form of insulation on the back;
- The alternative is the evacuated tube collector. The principle is the same as for the flat plate collector, but each pipe and its absorber are sealed in an evacuated glass tube to reduce heat loss. Often the pipe contains a volatile liquid which evaporates on heating and condenses at the end of the pipe in a small heat exchanger. There the heat is passed to the fluid which carries it back to the hot water tank.

The fluid used to transfer the heat is often water with a non-toxic antifreeze additive for protection. It is possible to use tap water but the risks of freezing make this uncommon in the UK.

Applications for Active Solar Heating

The most common application is the provision of heat for domestic hot water (DHW) systems.

DHW systems are composed of a solar collector array, a pre-heat tank (optional), a pump, a control unit, connecting pipes, the normal hot water tank, and a conventional heat source. The conventional heat source is necessary because a standard solar system in the UK cannot provide sufficient heat to supply hot water at the desired temperature throughout the year.

The other major use for the technology in the UK is for swimming pool heating, where it is particularly suited to pools used only between Spring and Autumn. These may be outdoor pools or enclosed pools where the air over the water is not conditioned. In these situations the pool water need only be a few degrees above ambient temperature. This allows the use of cheaper, unglazed collectors with less insulation. The pool water can be passed directly through the collectors, often using the existing pool filter pump, though for larger pools a more complex system is often required. The collectors are situated near the pool, either on the ground, on a support structure or on a nearby building. A collector area equivalent to more than half the pool area is usually required.

Targets for the Yorkshire and Humber Region

Domestic Active Solar Heating

Estimates of uptake can be made for the region based on historical and industry projections for active solar heating. There is currently a small established market for active solar systems in the UK, with fairly steady sales since the mid-1980s and an estimated cumulative capacity of about 276,000m^2, representing about 48,000 systems. On the basis that the region has about 10% of the national housing stock total, this would imply that around 4800 systems are already in place.

We propose that the growth of the market can again be represented by two scenarios, broadly representing "business as usual", based on the historical growth of installations over the last few years, and a "green future" using elements of data provided by the Active Solar Industry[12].

In the last few years the average rate of ASH installations across the UK has been steady at around 2,000 per year. Assuming again that Yorkshire and the Humber has 10% of the national housing stock, this suggests that might currently be a yearly regional installation rate of about 200 installations. If this trend continued until 2010, the increase in systems will be 2000. ***Assuming a typical output of 1.2MWh of heat energy per system per year the increase in heat energy produced from new ASH systems would be 2.4GWh/year. At the same uptake rate, the increase in systems to 2021 would be 4200, producing 5GWh/year.***

[12] ETSU S/P3/00173/REP – "Active Solar Heating - Industry Development Study", Solar Trade Association (1995)

The Solar Trade Association has produced two scenarios for the expansion of the ASH market based on market support initiatives. The 'baseline' programme is thought to be a realistic "green future" scenario. As described, it did not originally assume any change to VAT, and so the recent reduction in VAT from 17.5% to 5% announced in the 2000 budget could offset the £260k/year of Government support that is assumed to be part of the programme. The UK prediction is for 157,000 systems by 2010, an increase of 109,000. ***Assuming once more that the region's housing is 10% of the UK total, this projected national growth to 2010 would result in an increase in regional domestic systems of 11,000, producing a total of 13GWh/year of heat energy. Projecting forward on the same basis, the increase in systems to 2021 would be 23,000 producing 28GWh/year.***

Swimming Pools

In 1995 it was estimated that there were 100,000 swimming pools in the UK and that the number of pools would double by 2025. However, growth in ASH (in terms of collector area sold) applied to swimming pools has been about half that of the domestic hot water sector. We therefore assume that, ***in the "business as usual" scenario, the heat energy increase from all swimming pool installations would be half that in the domestic installations, or 1.2GWh/year to 2010 (2.5GWh/year to 2021). For the "green future" projections an equivalent increase would be about 6.5GWh/year to 2010 (14GWh/year to 2021).***

SMALL SCALE HYDRO

Table 9 below shows potential small-scale hydro sites within Yorkshire which have been identified within a major UK-wide report[13] on the technology. We use these sites as the basis of our estimates of deployable potential, bearing in mind that many small hydro sites have encountered economic, environmental or institutional barriers to deployment.

OTHER TECHNOLOGIES

Geothermal Energy – Aquifers

Geothermal aquifers exploit heat from the Earth's crust from naturally occurring ground waters in deep porous rocks. Exploitation of the available heat is through production and injection boreholes (sometimes just the former where used water can be discharged to the sea or some other sink) which are used to extract the energy for heating purposes or - at higher temperatures (>150^{o}C) - electricity generation.

The UK's aquifer resources generally have temperatures of less than 60^{o}C, so that the resource is unsuitable for electricity generation. Across Yorkshire and the Humber, there is an aquifer source associated with the East Yorkshire and Lincolnshire Basin, an extensive area of mesozoic sandstone. Investigations of this aquifer occurred as part of the Department of Energy's extensive work on geothermal aquifers in the late 1970s and mid-1980s[14]. This revealed that the aquifer underlying the coast from Scarborough southwards

[13] "Small-scale Hydroelectric Generation Potential in the UK", (ETSU SSH-4063, Parts 1-3) (1989)
[14] "Geothermal Aquifers", Department of Energy R&D Programme 1976-1986 (ETSU R-39) (1986)

Table 9 – Potential small hydro sites identified across Yorkshire and the Humber

River	Capacity if Installed (kW)	OS Map Number	Grid Ref Powerhouse Intake	Location	Town
WENNING	70	97	SD650692	MILL	LOW BENTHAM
KINGSDALE BECK	122	98	SD695735	THORNTON FORCE	INGLETON
CALDER	76	104	SE052240	HOLLINS MILL	SOWERBY BRIDGE
CALDER	67	104	SE041240	LONGBOTTOM MILL	SOWERBY BRIDGE
CALDER	101	104	SE413225	SUGDENS MILL	SOWERBY BRIDGE
CALDER	227	104	SE186208	MIRFIELD WEIR 1	MIRFIELD
CALDER	224	110	SE217198	MIRFIELD WEIR 2	MIRFIELD
WHARFE	463	110	SE167473	GREENHOLME FARM	BURNLEY IN WHARFE
WHARFE	121	104	SE241455	WHITELEY MILL	POOL IN WHARFEDALE
WHARFE	153	98	SE999635	LINTON MILL	GRASSINGTON
WHARFE	170	98	SE002633	LINTON FALLS	GRASSINGTON
URE	40	98	SE011887	YORK MILL	AYSGARTH
URE	274	98	SE044900	REDMIRE FORCE	CASTLE BOLTON
BAIN	74	98	SD935901	BAIN MILL	BAINBRIDGE
DUERLEY BECK	40	98	SD871894	GAYLE MILL	GAYLE
SWALE	90	92	NY885015	WAIN WATH FORCE	KELD
SWALE	144	92	NY888015	PARK BRIDGE	KELD
GUNNERSIDE GILL	99	98	SD950980	GUNNERSIDE	GUNNERSIDE
ARKLE BECK	68	98	SE040995	REETH MILL	REETH
SWALE	234	99	NZ174006	CASTLE FALLS	RICHMOND
WALDEN BECK	102	98	SE019869	WEST BURTON	WEST BURTON
NIDD	101	104	SE367558	HOUGH FARM	KNARESBOROUGH
NIDD	132	99	SE193629	LOW LAITHE	SUMMERBRIDGE
WORTH	31	104	SE054395	GROVE MILLS	KEIGHLEY
AIRE	47	103	SD942541	AIRE BANK MILLS	GARGRAVE
AIRE	44	103	SD904592	AIRTON MILL	AIRTON
NIDD	82	99	SE200624	NIDD VALLEY MILL	SUMMER BRIDGE
NIDD	93	104	SE246597	WREEKES MILL	BIRSTWITH
NIDD	125	104	SE346568	CASTLE MILL	KNARESBOROUGH
NIDD	105	104	SE316585	SCOTTON MILL	SCOTTON
NIDD	72	99	SE171644	GLASSHOUSES MILL	GLASSHOUSES
ELLERBECK	67	94	SE828022	THOMASON FORCE	GOATHLAND
SEA CUT	55	101	TA027907	SCALBY, WEIR 1	SCALBY
SEA CUT	56	101	TA014904	SCALBY, WEIR 3	SCALBY
DERWENT	253	105	SE704473	ELVINGTON WEIR	ELVINGTON

DERWENT	107	105	SE714556	LOCKGATE	STAMFORD BRIDGE
WHARFE	215	105	SE404480	WETHERBY WEIR	WETHERBY
NIDD	98	105	SE428531	HUNSINGORE CORN MILL	HUNSINGORE
URE	54	99	SE277785	WEST TANFIELD	WEST TANFIELD
URE	216	99	SE252772	MICKLEY MILL	MICKLEY
URE	294	99	SE354672	NEWBY LOCK WEIR	ROECLIFFE
WHARFE	237	105	SE422473	FLINT MILL	FLINTMILL GRANGE
AIRE	274	105	SE494242	KNOTTINGLEY	KNOTTINGLEY
CALDER	178	105	SE429259	ALLINSONS MILL	CASTLEFORD
WHARFE	263	105	SE486437	TADCASTER WEIR	TADCASTER
URE	292	99	SE395671	BOROUGHBRIDGE WEIR	BOROUGHBRIDGE
AIRE	82	110	SE304175	DURKAR WEIR	DURKAR
DON	148	111	SE566037	CRIMPSAL SLUICES	DONCASTER
DON	100	111	SK403921	ROTHERHAM SEWAGE	ROTHERHAM
LOXLEY	51	111	SK310894	LOXLEY	LOXLEY
DON	59	110	SK328915	NIAGARA FORGE	SHEFFIELD
OUSE	903	100	SE500602	LINTON-ON-OUSE	LINTON
NABURN(TIDAL)	900	105	SE594446	NABURN LOCKS	NABURN
URE	775	98	SE012888	MIDDLE FALLS	AYSGARTH
Total 54 Sites	**9468**				

to Grimsby and beyond had some potential to provide hot water at low temperatures (45-50^{o}C), in association with activities such as horticulture or under-floor building heating.

Wave Energy

Waves are caused by wind disturbing the surface of the sea. To tap this potential source of energy, devices are needed to convert the uneven motion of waves to electricity.

Wave power levels around the UK are highest along the exposed northern and western coasts, where it is most likely that developments will proceed. Yorkshire and the Humber is very unlikely to be a focus for wave energy deployment up to the 2010 time horizon. Beyond that time, it is possible to envisage either that deployment of wave energy devices may become much more widespread around the UK or – alternatively – that the costs of implementation may prove prohibitive to schemes outside the most favoured resource areas. For Yorkshire and the Humber, these future possibilities are reflected in a wide range of deployment estimates for 2021 as shown in Table 10 below.

Table 10 – Possible Scenarios for Regional Wave Energy deployment by 2021

Deployment Type	"Business As Usual"	"Green Future"
Shoreline Wave (typically 1MW)	1	3
Offshore (typically 30MW)	0	5

Tidal Energy

Tides are caused by the gravitational attraction of the Sun and Moon that periodically raises and lowers the ocean surface. Near to land, the effect is increased in estuaries leading to the possible deployment of *tidal barrage* technology. Across narrow straits, turbines could be placed to exploit *tidal currents*.

The UK has some of the best tidal barrage energy resources in the world, mostly located along the west coast of England and Wales. However, Yorkshire and the Humber's mean tidal range is unlikely to be high enough for it to be seriously considered as a location for tidal barrage technologies, even beyond 2010.

The tidal current resources off the coast of the region are not thought to be amongst the most promising sites in the UK[15]. Given the strong relationship between high tidal current velocities and economic exploitability, we propose that there is only a limited prospect for this technology to appear off the region's coast by 2021.

Fuel Cells

Fuel cells are electrical devices similar to batteries except that the fuel (usually a hydrogen-rich gas) and oxidant are supplied from an external source, to produce both electricity and heat directly. They are clean, highly efficient and represent a key enabling technology to a future hydrogen economy, and therefore to the longer-term widespread deployment of renewable energy technologies. They are being actively considered for distributed power, residential and commercial scale CHP, as well as transport and portable power applications.

[15] "New and Renewable Energy: Prospects in the UK for the 21st Century", Supporting Analysis (ETSU R-122) (1999)

Once the remaining development issues have been addressed and the purchase costs reduced by improved design and low-cost mass production techniques, the deployment of fuel cell systems is expected to be rapid. However, it is very difficult to predict when this take-off will happen and it is unlikely to occur much earlier than 2010. For example, high-temperature types of fuel cells best suited to larger scale generation plant, require significant R&D to tackle the remaining material durability issues.

Early demonstrations will be essential, to generate operating experience and to establish reliability. Support for the evaluation of pre-commercial prototype systems, extended field trials and demonstrations would also help stimulate an early market, giving confidence on which investment decisions on manufacturing plant can be based.

The development of scenarios for the deployment of fuel cells up to 2010 is therefore particularly tentative, and could be considered to have a high level of uncertainty. We have used the following assumptions, together with available data for the region's housing stock, population, major industrial cities, etc., to derive projections for uptake by 2010 and 2021. Estimates have initially been made for the region as a whole, but using the "sub-regional" characteristics shown below.

- Although sparsely populated, North Yorkshire could be an early market for remote fuel cell power systems on farms, etc. The penetration could occur slightly quicker here and then approach a lower saturation level;
- The deployment of domestic/remote power fuel cell systems in 2021 is taken to be between about 1% ("business as usual") and 10% ("green future") of the housing stock respectively;
- Deployment of large scale systems is likely to be focused on major industrial centres and, due to technology development issues for high temperature fuel cells, likely to start later than for domestic and industrial systems;
- The installed capacity of large-scale systems is taken to be between 1-10 MW per installation, with larger installations appearing in the more ambitious scenarios.

Table 11 – Scenarios for fuel cells deployment across Yorkshire and the Humber

Deployment Type	**Business as Usual**				**Green Future**			
	2010		2021		2010		2021	
	No.	Capacity (MW)	No.	Capacity (MW)	No.	Capacity (MW)	No.	Capacity (MW)
Domestic and remote fuel cell CHP systems (~5kW)	10	0.05	20000	100	10000	50	100000	500
Industrial scale fuel cell CHP systems (50~500kW)	1	0.2	100	20	50	10	1000	200
Large-scale power generation fuel cells (1-10MW)	0	0	1	1	2	2	10	100

ENERGY FROM WASTE

A Landfill Gas

The Table below shows our estimates of the existing and proposed landfill gas (LFG) schemes across the region. These estimates are derived largely from the prospective NFFO data shown in Annex C3, but in addition includes our estimates of energy generating schemes which have appeared - or may appear - independently of NFFO.

Table 12 – Actual and proposed energy generation from landfill gas schemes across Yorkshire and the Humber

County	Current LFG schemes (MW)	Proposed LFG schemes (MW)	Total (MW)
North Yorkshire	2.38	3.25	5.63
South Yorkshire	9.64	8.91	18.55
West Yorkshire	14.12	33	47.12
Humber	6.24	11.13	17.37
Totals	**32.38**	**56.28**	**88.66**

B Waste Incineration

We have estimated the likely opportunities for energy-from-waste incineration plant to appear within the region based upon our knowledge of actual or prospective Waste Authority strategies, and have also sought the views of the Regional Integrated Waste Management Strategy Steering Group (RIWMS).

Sheffield currently has an energy-from-waste plant with capacity of 130,000 tonnes/year, and the city is planning to build a new 200,000 t/y plant. The 135,000 t/y facility in Kirklees is almost completed and the 50,000 t/y plant in North-East Lincolnshire is also under construction. East Riding of Yorkshire and City of Kingston upon Hull are awaiting the outcome of an inquiry in respect of their joint 165,000 t/y plant.

All other local authorities are working on their waste management strategy. Their priority is to increase the amount of waste recycled in order to meet statutory recycling targets as well as the Landfill Directive targets for diversion of biodegradable municipal solid waste (BMW). The latter requires the amount of BMW landfilled to be reduced to 75%, 50% and 35% of the 1995 values by 2010, 2013 and 2020, respectively.

The RIWMS are undertaking a study of future waste options for the region. They suggested that the most appropriate course was to assume a continuation of the status quo from 2010 to 2021. There was likely to be a continuing existence of MIW - with plants constructed up to 2010 with long waste disposal contracts likely to be still operating in 2021.

It is very likely that the plants in Sheffield, Kirklees, North East Lincolnshire and the joint plant for East Riding of Yorkshire and City of Kingston upon Hull will be the only ones to be built prior to 2010. Based on an assumed energy output average of 500 kWh/tonne the capacities of these plants will be 13.3 MW, 9 MW, 3.3 MW and 11 MW, respectively

adding up to a total potential “new” capacity of 36.6 MW and consuming 550,000 tonnes of waste every year.

ANNEX B2 EMBEDDED GENERATION ISSUES

Introduction

Yorkshire and the Humber region has a well developed transmission system with many grid connected power stations such as the coal fired plant at Drax, Eggborough and Ferrybridge. Because of good access to the mains gas network around the Humber area there is also significant gas generation connected such as that at Killingholme and Keadby. In this region the national grid network serves the local distribution networks through over 20 grid supply points.

Both Yorkshire Electricity and Northern Electric have a mixture of rural, urban and industrial distribution network circuits in the region. Yorkshire Electricity in particular serves the densely populated and heavily industrial areas of Leeds, Bradford, Hull, Doncaster and Sheffield. Maximum demand in the Yorkshire Electricity region is about 4 GW[16], the Northern Electric component of maximum demand in Yorkshire and the Humber region is not known but is thought to be small.

Embedded Generation

According to the National Grid's Seven Year Statement[16], Yorkshire Electricity has 670 MW of embedded generation (of individual plant size over 5 MW) and Northern Electric has approximately 70 MW of embedded plant (of individual plant size over 5 MW) within Yorkshire and the Humber.

This embedded plant is mostly gas and diesel fired but does include an amount of renewable energy, particularly wind and energy from waste electricity generation.

Network Capacity

It is difficult for the respective network operators to analyse the spare capacity for embedded plant in their regions without doing extensive power system studies. Both Yorkshire Electricity and Northern Electric identify - as most network operators would - voltage regulation problems with the further integration of embedded plant on rural networks and largely fault current limitations on the urban regions of their networks. To overcome these constraints to further connection, investment would be needed to upgrade switchgear, cabling, transformers and other network infrastructure.

In addition, with significant local generation there will be a need to change the network operator's management approach to what is still essentially a passive network arrangement. Further embedded generator integration will require active command and control systems to ensure that at all times the network is functioning to within its statutory parameters.

A number of studies have endeavoured to estimate the capacity of the local network in the region to accept more embedded plant. A network review[17] carried out by Merz and McMellan (now P B Power) in 1999 estimated that the Yorkshire Electric network could

[16] National Grid Company Seven Year Statement 2000
[17] DTI New and Renewable Energy Programme: Contractor's Report K/EL/00188/REP

probably accept an additional 650 MW of embedded plant, with 200 MW in rural areas and 450 MW in urban areas. The same report estimates for the whole of the North East region that a further integration of 150 MW in rural areas and 100 MW in urban areas may be possible. The LYREPS study estimated that this geographical area (which includes the main conurbations of Leeds, Doncaster and Sheffield) had an ability to accept about 750 MW of embedded capacity without further network upgrade.

Enabling Embedded Generation

How embedded plant is integrated onto the network is of growing concern, with the realisation that this may be a major barrier to Government aims for sustainable energy development. In view of this, in 1999 the DTI consulted the electricity supply industry on embedded generation and how its connection to the network could be effectively implemented as more small scale plant comes on-stream[18].

From this initial consultation a number of OFGEM and DTI studies and consultations are currently ongoing to examine how these concerns can be effectively addressed at minimum cost to the consumer. In 2000 the DTI and OFGEM published the results of a working group[19] study considering these issues, and OFGEM[20] currently have a major consultation in process. Through 2002 a Distributed Generation Co-ordination Group will meet to continue this work. This group will consider all the issues that may act as a barrier to the take-up of embedded generation such as network operator incentives for connection, network management, connection costs and developer network information provision.

[18] DTI consultation: Electricity network management Issues, November 1999
[19] Report into Network Access Issues Vols. 1&2: OFGEM and the DTI publication, January 2000
[20] Embedded Generation: Price controls, incentives and connection charging, OFGEM September 2000

ANNEX B3 REVIEW OF LANDSCAPE CHARACTER ISSUES

Background

There is no statutory requirement to undertake a landscape character assessment of local authority areas or sub-regions. However, such assessments can provide a useful basis for the development not only of local plans and unitary development plans but also of other plans and policies that influence and are influenced by landscape. The impact of renewable energy projects on the landscape has been shown to be of particular importance when local planning authorities are assessing particular proposals. An understanding of the current landscape context within the region is therefore of importance.

Planning Policy Guidance 7 identifies the importance of a soundly based formal assessment of the qualities of the countryside when considering the function and justification of local countryside designations. Such designations carry less weight than national designations and PPG7 identifies concerns that they may "*unduly restrict acceptable development and economic development without identifying the particular features of the local countryside which need to be respected or enhanced*" . It is therefore important that designations within a local plan that may influence the acceptability of proposals for renewable energy, as detailed in the NFFO section of this report, are based on a robust landscape character assessment.

Regional planning guidance recognises that the region has a rich and diverse landscape. It includes both the Yorkshire Dales and North York Moors National Parks, a number of Areas of Outstanding Natural Beauty, heritage coastline and other areas that have been designated at the local level. Such areas contribute to the region's identity. In addition there are urban conurbations, urban fringe areas, former mining areas and intensive agricultural areas, the landscape of which has declined. These represent a different character of the region.

Policy N3 of RPG seeks to protect and enhance the quality, diversity and local distinctiveness of the regions. This is to be achieved through development plans that are informed by landscape character assessments. The guidance emphasises that local authorities should be aware of the importance of the environmental qualities of key gateways and corridors within the region. These include the main north-south and east-west transport corridors and also the Humber estuary, an important gateway from Europe.

Countryside Character Initiative

The Countryside Agency and English Nature has categorised the region into locally distinctive countryside character areas. RPG recognises that landscape assessments such as this can be used to inform the location of different types of development. This can include renewable energy schemes.

The Countryside Character Initiative categorises the Yorkshire and Humber region into 24 distinct areas. These do not fit with the area covered by regional planning guidance and hence this study, but represent an attempt to examine the area in terms of its landscape characteristics. Each area is described in terms of its landscape character, physical, historical and cultural influences, buildings and settlements and land cover. From this a key

set of characteristics is identified. Changes to the countryside are also noted and from this ways in which the future of each area can be shaped are then identified.

Given the large number of landscape character areas identified it is difficult to establish common threads and patterns. However, these can be used as a baseline on which more detailed character assessments can be undertaken.

Existing landscape character assessment coverage in Yorkshire and the Humber

To provide an understanding of the nature and extent of existing landscape character assessment studies within the region a survey of all local authorities within the Yorkshire and Humber region was undertaken. This has revealed that 19 authorities have undertaken landscape character assessments. Many such studies have been undertaken within the context of the review of development plans and form background studies to these statutory documents. The table below details those authorities that have carried out landscape character assessment studies.

More detailed consideration of three landscape character assessments has been carried out to establish the general format and purpose of these documents, together with their usefulness in providing a framework for planning decisions on renewable energy proposals.

Bradford

In Bradford there are a number of levels of documentation that deal with landscape character. At a regional level the Standing Conference of South Pennine Authorities (SCOSPA) has published a regionally based Landscape Assessment, Landscape Guidelines and Countryside Design Summary for the South Pennines.

At the local level the Council's supplementary planning guidance on wind turbine developments provides very broad and general advice as to the types of landscapes that are likely to be more capable of absorbing wind turbine development. This guidance does recognise, however, that whilst a proposal may fall within a landscape in which in general terms turbines may be more appropriate, local considerations may mean that a proposal is inappropriate in that location.

Since the adoption of this SPG in 1995 a more detailed landscape character assessment has been undertaken as part of the unitary development plan review process. A number of the objectives of this study are relevant to the deployment of renewable energy in the district. They are:

- To recommend appropriate landscape management and land use planning strategies, and to suggest guidelines to assist in achieving those strategies;
- To provide a basis for the formulation of plans, policies and proposals for the landscape of the District;
- To guide Planning Officers in their work in determining planning applications.

Bradford's study takes the Countryside Commission's Character Programme as its starting point and recognises that the resulting character map provides an important strategic framework. From this a series of Character Areas and generic Landscape Types have been

established. Within each Character Area Local Landscape Types were analysed in more detail.

Detailed description of the natural landscape and cultural landscape is given for each Character Area. This is followed by an analysis of the sensitivity of the area including the significance of any new development that has taken place and identification of current pressures on the integrity of the landscape. This may include reference to renewable energy developments such as wind farms. Important features such as landmarks, skylines, key vistas and memorable places are also identified for each area.

The detailed assessment of Local Landscape Types includes an analysis of the relative strength of character of an area and its condition that results in a set of policy guidelines for the conservation, strengthening, creation or restoration of the area. Clear guidance is given as to whether it is envisaged that a particular Local Landscape Type has scope for development, including renewable energy developments, particularly wind turbines.

East Riding of Yorkshire

Of particular note in the context of this study is the study commissioned by East Riding of Yorkshire Council entitled the 'South Holderness Wind Energy Development Landscape Guidance'. This study was commissioned in order to provide landscape guidance on commercial wind energy developments within this part of the authority. It aims to provide indicative guidance on the capacity of landscapes in South Holderness to accommodate wind energy development.

The study seeks to distinguish between impacts on landscape character and visual influence or visibility of potential wind developments. Three basic effects are identified:

- "on-site physical change to the fabric of the landscape - i.e. to accommodate turbine and ancillary infrastructure;
- change to the character or 'visual' appearance of the landscape as perceived from the public domain;
- change to the amenity of the area i.e. the local landscape as perceived from residences, settlement and private land."

The report goes on to provide guidance for assessing cumulative impact, both in terms of the collective effect of two or more simultaneously visible sites from areas of mutual or shared visibility, and the potential collective effects on the character of an area as perceived when travelling through a landscape seeing sites sequentially.

The report builds on existing work carried out by ETSU "The Visual Impact of Wind Farms - Lessons from the UK Experience", adapting criteria used.

Following receipt of three planning applications for wind farms in close succession and in close proximity to each other a supplementary report was prepared to assess the landscape and visual impacts of these proposals. This was used by the Council to assist with the determination of the planning applications, with all schemes being refused planning permission. The planning officer’s report, together with the Inspectors report that arose following the lodging of two appeals make a number of references to the original and supplementary landscape assessment reports emphasising the importance of landscape

impact and the role of landscape character assessments to the decision-making process in this case.

Ryedale District Council

In Ryedale landscape character assessments were undertaken in 1995 and 1999 by landscape consultants. The former (An Assessment of the Landscape North and South of the Humber with Management Guidelines for its Future) covered the former county of Humberside extending north to cover the northern part of the Yorkshire Wolds (Ryedale and Scarborough districts).

The assessment was used to classify and define different landscapes and to formulate landscape guidelines. In the context of renewable energy this was intended to assist with the following:

- The formulation of local authority policies;
- Aid development control

As with the Bradford study a strategic assessment was carried out resulting in ten Regional Landscape Character Areas with a more detailed focus on 26 Local Landscape Types. Pressures on the landscape were identified by the study, including power generation and transmission. The development of wind power along the North Sea coast and on high ground inland is recognised as an 'exciting means of generating 'clean' electricity'. However, they tend to be sited in areas of high visibility and often high landscape value. The study recognises that planning authorities must balance the requirement for prominent sites with the need to protect landscape quality.

A range of pressures on the landscape are identified with a summary of the issues associated with these detailed. In respect of power generation these include:

- *Consideration of the design of the structures themselves and the number and layout within each group of structures;*
- *Consideration of local landscape type and its potential to accommodate large vertical structures;*
- *The impact of skyline development and potential use of 'backgrounding' vegetation or ridges;*
- *Consideration of the zone of visual influence and the possibility of landscape mitigation and integration by offsite planting;*
- *The need for strategic environmental assessment, consideration of alternative sites and the use of professional landscape advice.*

For each landscape character area a description of the physical, human and ecological influences is provided together with details of the visual characteristics of the area. Landscape guidelines related to power generation are detailed where appropriate.

Guidelines for Local Landscape Types are given. The issue of wind farms is not viewed as significant for many areas covered by the study. However, in the Lincolnshire Wolds it is considered that vertical structures cannot easily be assimilated into the open rolling landscape of this area and would be highly prominent in elevated and skyline positions.

Consequently the guidelines suggest that in this area the introduction of wind farms and other similar vertical structures should be prohibited.

Landscape guidelines for more locally identified areas within the Lincolnshire Wolds e.g. High Farmland advocate that "*due to the elevation, expansiveness and relative isolation of this sensitive arable landscape there should be a predisposition against the development of wind power generating facilities*" .

The later study, The Landscapes of Northern Ryedale, carried out in 1999 takes as its basis the Countryside Commission's national study, thereby providing a consistent base and methodology from which to work. There are some similarities with the previous study undertaken in the area with the primary characteristics of each area identified and a landscape strategy and guidelines set out. These include, as before, communications and infrastructure within which is included wind turbines.

The study describes in general terms each local landscape character type. It then goes on to identify the sensitivity to change of each individual area. Where it is perceived that wind turbines could potentially result in a change to the character of the landscape guidance as to their acceptability is given.

The study envisages that the landscape character assessment would be used within the context of existing mechanisms including the determination of planning applications, particularly those that require environmental impact assessment. It goes on to suggest other areas where landscape assessments could be used to influence changes to the landscape of Ryedale.

Comment

It is recognised that the impact of RE schemes on the landscape of the region is an important consideration when assessing planning proposals. In order that a careful and considered response to landscape character can be given by local planning authorities, comprehensive and up to date coverage of the region by landscape character assessments should ideally be in place. These can then be used to inform the development plan process, to assist in decision-making and provide developers of renewable energy projects with a clear indication as to which types of landscapes, and therefore which areas, are considered most sensitive to such proposals. Nevertheless, the absence of landscape assessments should not in itself be seen as an impediment to judgements on RE scheme proposals.

Whilst the general approach taken by the Countryside Character Initiative and other more local studies in the region is useful in identifying broad character types, further studies should consider as part of their analysis the specific implications of landscape character for renewable energy, such as that carried out in East Riding. Those technologies that would benefit most from this approach are wind and biomass. Where there are existing studies these should be used, as far as possible, to inform developer's decisions and to inform decision makers when considering specific proposals.

Whilst some concerns have been raised by stakeholders in this study as to the potential impact of biomass crops on the landscape it is noted that biomass does not feature within any of the landscape character assessments studied. Whilst it is acknowledged that the

planting of biomass crops strictly falls outside of the planning system its impact may be included within any landscape and visual impact assessment undertaken as part of an environmental impact assessment. Other opportunities for the assessment of their impact also exist where grants for crops such as short rotation coppice are sought.

In order for developers of renewable energy schemes to have a greater certainty in respect of the influence of landscape character a common approach to landscape character assessment should be adopted by the region, as far as is possible. This may, as largely takes place at present, be based on the Countryside Agency's Countryside Character Initiative. This should ensure greater consistency in the decision-making process. It is clear that a number of the studies already carried out are somewhat dated and were completed prior to the publication of the Countryside Agency's study. Whilst there is therefore a need for the completion of an up to date landscape character assessment for each local authority area, this should be seen as part of the backdrop within which RE schemes should be assessed, rather than a prerequisite.

Summary of Regional Landscape Character Assessments

District	Landscape Character Assessment undertaken	Status/comment
Barnsley	Yes	A small-scale assessment was undertaken approximately 10 years ago to form the basis of UDP landscape allocations. Some local work has been undertaken since but only for parts of the borough. The Council is in the process of developing a brief for a future landscape assessment that will form part of UDP review process.
Bradford	Yes	The report is currently in draft form and is a supporting document to the deposit local plan.
Calderdale	Yes	A specific study for Calderdale has not been undertaken but a study was carried out for SCOSPA in 1999. It has no formal status.
Craven	No	N/A
Doncaster	Yes	A study was previously undertaken by DTA Environment on behalf of the council. It has no formal status.
East Riding	No	Whilst no landscape character assessment has been undertaken for the district, an assessment exists for Humberside (undertaken before local government reorganisation). It has no formal status.
Hambleton	Yes	The assessment forms a background paper to the Local Plan review and has no formal status.
Harrogate	Yes	A landscape character assessment was undertaken in 1993 as part of local plan process. It has no formal status. The Council wishes to update this assessment in the near future.
Humberside	Yes	A landscape character assessment was undertaken by Gillespies prior to local government reorganisation. It has no formal status.
Kingston Upon Hull	Yes	A landscape character assessment was undertaken by City Vision.
Kirklees	Yes	A landscape character assessment has been carried out. It has no formal status. It will form part of UDP review process in due course.
Leeds	Yes	A landscape character assessment was undertaken by Land Use Consultants in association with the council and the Countryside Commission. It has advisory status but has not been adopted as supplementary planning guidance.
North East Lincolnshire	Yes	The Council is in the process of adapting the Humberside county assessment to a local level. It is hoped that this will be adopted as supplementary planning guidance in the future.

North Lincolnshire	Yes	A landscape character assessment study has been completed. It is currently out for consultation as part of supplementary planning guidance
North Yorkshire Moors National Park	Yes	A previous basic study was undertaken, the results of which were incorporated into the National Park Management Plan
Richmondshire	No	N/A
Rotherham	Yes	A small-scale landscape character assessment related to parks in the area was carried out previously.
Ryedale	Yes	A landscape character assessment undertaken by Gillespies in 1995 as part of local plan review process. The study has no formal status A further landscape character assessment study for the Vale of Pickering and fringe of the North York Moors National Park was carried out in 1999.
Scarborough	Yes	A landscape character assessment study has previously undertaken.
Selby	Yes	A landscape character assessment study was undertaken by Woolerton Dudwell Associates. The study is a background paper to the Local Plan review process and has no formal status.
Sheffield	No	N/A
Wakefield	No	No study has been undertaken and there is no intention to carry one out.
York	Yes	A landscape character assessment study was undertaken by Environmental Consultancy at University of Sheffield. It currently has no form al status although it is hoped that it can be adopted as supplementary planning guidance in the future.
Yorkshire Dales National Park	Yes	A landscape character assessment was undertaken in October 2001 by Estell Warren. It has no formal status.

ANNEX B4 ILLUSTRATIVE TARGETS BASED UPON SCENARIO GENERATION

ILLUSTRATIVE RENEWABLE ENERGY ELECTRICITY SCENARIOS FOR 2010 IN YORKSHIRE AND THE HUMBER

Indicative Renewable Energy Generation Type/Size	Existing Installed Capacity (MW)		Scenario A		Scenario B		Scenario C	
	Schemes	Capacity	No. of New Schemes	Installed Capacity	No. of New Schemes	Installed Capacity	No. of New Schemes	Installed Capacity
Offshore Wind Farms (60-100 MW; 20-30 Turbines)	0	0	0	0	1	60	2	160
Wind Farms (25MW; 10-20 Turbines)	3	24.65	1	25	3	75	7	175
Small Wind Clusters (6 MW; 4-10 Turbines)	1	1.2	4	24	7	42	12	72
Single Large Wind Turbines (1.5 MW)	4	0.78	4	6	10	15	20	30
Single Small Wind Turbines/Chargers (0.03 MW)	?	?	10	0.3	20	0.6	30	0.9
Co-firing of Biomass in Existing Fossil-Fuelled power stations	0	0	0	0	2	11	2	50
Large CHP / Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (20+ MW)	1 Wood 1 Chicken Litter	26.7	1 Wood	20	1 Straw 2 Wood	20 50	2 Straw 2 Wood	40 50
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	0	0	0	1 Wood	5	2 Wood	10
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	0	0	0	1	0.5	2	1
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	0	0	0	0	1	0.5	2	1
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	1	6.1	2	22.3	3	25.6	4	36.6
CHP or Electricity Plants Fuelled by Landfill Gas	12	25.8	27	56	27	56	27	56
Small-Scale Hydro Power (0.1 MW)	0	0	2	0.35	4	0.7	6	1
Domestic PV Installations (1.5-3kW$_p$)	?	≈0.15	1500	2.2	3000	4.5	7000	10.5
Commercial PV Installations (50kW$_p$)			20	1	40	1.5	62	3.1
Motorway PV Installations (160kW$_p$/km)			0	0	5	0.8	15	2.4
Fuel Cell (FC) installations	0	0	≈10	0.25	125	5.5	10000	≈60
Total	**23 + PV**	**85.4**	**51 + PV/FC**	**157**	**83 + PV/FC**	**374**	**120 + PV/FC**	**760**

ILLUSTRATIVE RENEWABLE ENERGY ELECTRICITY SCENARIOS FOR 2021 IN YORKSHIRE AND THE HUMBER

Indicative Renewable Energy Generation Type/Size	**Existing Installed Capacity (MW)**		**Scenario A**		**Scenario B**		**Scenario C**	
	Schemes	Capacity	No. of New Schemes	Installed Capacity	No. of New Schemes	Installed Capacity	No. of New Schemes	Installed Capacity
Offshore Wind Farms (60-100 MW; 20-30 Turbines)	0	0	2	160	3	260	4	400
Wind Farms (25MW; 10-20 Turbines)	3	24.65	7	175	8	200	15	375
Small Wind Clusters (6 MW; 4-10 Turbines)	1	1.2	12	72	20	120	35	210
Single Large Wind Turbines (1.5 MW)	4	0.78	20	30	50	75	80	120
Single Small Wind Turbines/Chargers (0.03 MW)	?	?	30	0.9	120	3.6	250	7.5
Co-firing of Biomass in Existing Fossil-Fuelled power stations	0	0	0	0	0	0	0	0
Large CHP / Electricity Plants Fuelled by the Combustion of Energy Crops and/or Agricultural & Forestry Biomass (AFB) (20+ MW)	I Wood 1 Chicken Litter	26.7	2 Straw 3 Wood	40 80	2 Straw 6 Wood	40 160	2 Straw 10 Wood	40 280
Small CHP Plants Fuelled by the Combustion of Energy Crops and/or AFB (5-10 MW)	0	0	2 Wood	10	4 Wood	20	8 Wood	40
Anaerobic Digestion Plants Fuelled by Farm Biogas (0.5 MW)	0	0	2	1	10	5	20	10
Anaerobic Digestion Plants Fuelled by Sewage Gas (0.5 MW)	0	0	2	1	4	2	4	2
CHP or Electricity Plants Fuelled by Municipal or Industrial Solid Wastes	1	6.1	4	36.6	2	20	0	0
CHP or Electricity Plants Fuelled by Landfill Gas	12	25.8	12	28	6	20	0	0
Small-Scale Hydro Power (0.1 MW)	0	0	6	1	15	2.6	25	4.4
Domestic PV Installations (1.5-3kW$_p$)	?	≈0.15	7000	10.5	14700	22	95000	142
Commercial PV Installations (50kW$_p$)			62	3.1	100	5	130	6.5
Motorway PV Installations (160kW$_p$/km)			15	2.4	25	4	40	6.4
Fuel Cell installations	0	0	≈20000	≈120	≈50000	≈350	≈100000	≈800
Wave Energy Installations (1 or 30MW)	0	0	1	1	4	62	8	153
Total	**20 + PV**	**85.4**	**105 + PV/FC**	**773**	**254 + PV/FC**	**1371**	**461 + PV/FC**	**2597**

DESCRIPTION OF CONSULTATION SCENARIOS

In attempting to derive recommended renewable energy targets for 2010 and 2021 for Yorkshire and the Humber to adopt, the study is taking into account a variety of technical, economic, institutional, and other factors that may influence the possible deployment of each individual technology. These factors have been used to derive "consultation scenarios", intended to help focus a regional debate regarding the overall level of deployment and its composition.

To help provide a context for the consultation scenarios, we show below broad definitions of scenario characteristics for 2010 and 2021 that can be used to visualise their characteristics.

2010 - Scenario A

- This represents overall a relatively low level of additional deployment. For most technology areas (e.g. wind, biomass, waste) it continues the current trends within the Region and so could be classified as "Business as Usual". For other technologies (particularly PV) it represents a major increase from the current minimal regional uptake;
- In reaching the deployment implied by this target figure, it is assumed that few of the existing technical, economic or infrastructural barriers to some technologies are overcome;
- Wind energy schemes will typically come forward within a moderately supportive regional and sub-regional planning context. There is likely to be particular scrutiny of all proposed schemes, including those in close proximity to existing schemes elsewhere within the region or to designated areas. It is assumed that there will be no examples of deployment within designated areas across the region. The renewable energy obligation results in few additional wind energy schemes (beyond NFFO) until the last few years of the decade;
- One additional biomass scheme appears, with existing barriers to wider deployment persisting through the decade;
- PV deployment grows, but at a moderate rate in the absence of economic or other kinds of support incentives;
- Additional energy-from-waste schemes appear across the region in line with current NFFO contracts (landfill gas) or waste authority plans (waste incineration);
- Pilot examples of fuel cell installations appear.

2010 - Scenario C

- This represents a very ambitious level of deployment across the region, with all of the major technologies contributing very strongly to the overall target;
- In reaching the deployment implied by this target figure, it is assumed that the majority of the existing technical, economic or infrastructural barriers to technologies are overcome;
- Two offshore wind farms are constructed alongside the coast of the region;
- Significantly larger amounts of onshore wind power are deployed. Wind energy schemes will typically come forward within a supportive regional and sub-regional planning context. There will still be particular scrutiny of all schemes and any cumulative impact issues but with less tightness of restriction. There will probably be some isolated examples of deployment within designated areas but these will remain tightly controlled and of small scale. The renewable energy obligation results in additional wind energy schemes coming forward at a moderate rate from early in the decade;
- Substantial growth of short rotation coppice or other energy crops helps to provide major additional resources to complement exploitation of the existing woodland resource. More wood combustion schemes appear and the growth in "new" resource helps to improve the economics of smaller scales of deployment. In line with the Renewables Obligation, some of the wood resource is co-fired at existing power stations across the region;
- Deployment of PV expands dramatically in housing, commercial and "motorway" sectors. This expansion is achieved through major economic and infrastructural initiatives (e.g. closer and consistent links between Local Authority building control and planning regimes) as well as incentive mechanisms (e.g. export of surplus power from PV schemes to the grid is more favoured);
- Very significant growth occurs in the deployment of fuel cell technology.

2021 – Scenario A

- This represents a greatly delayed implementation of the Government's 10% target, by 2021 instead of the current target date of 2010. As such it assumes that all technologies fail to achieve significant deployment by 2010 itself, and that the pace of deployment remains slower than that implied within the Government's policies;
- The characteristics of this delay are economic, technical and infrastructural. Technologies that are not yet fully developed fail to show their full promise. Technologies that are currently more fully developed (e.g. PV) fail to achieve more significant deployment primarily due to economic factors. Technologies that are currently technically and economically deployable fail to achieve more rapid deployment due to the continuation of current barriers to deployment.

2021 – Scenario C

- This scenario represents a continuation and further acceleration of the trends developed within 2010-Scenario C. By 2021, this scenario would result in greater than 30% of the region's electricity being produced from renewable energy sources;
- Within this scenario, renewable energy schemes and their deployment have become the accepted norm. There is widespread public and institutional acceptance that these forms of energy generation should take precedence over many others, and therefore that they should be given priority "within the system";
- New forms of electricity supply have now evolved which place less reliance upon centralised distribution. "Community renewable energy" is a common concept, although it is not the only route through which renewable energy appears;
- Throughout the decade from 2010 to 2021, regional renewable energy businesses and employment have grown dramatically to provide the schemes envisaged for the region. These businesses form a part of the UK's dynamic renewable energy export activity;
- Four large windfarms are located off the coast of the region;
- Over 100 windfarms of various scales are deployed across the region. Additionally there are 250 "on-site" turbines providing power directly to businesses, institutions etc. Wind energy schemes come forward within a supportive and pro-active regional and sub-regional planning context. There is still scrutiny of all schemes and any cumulative impact issues, but there is a "presumption in favour" apart from a few areas of significant restriction. There are some examples of deployment within designated areas, but these remain controlled and much less numerous than schemes outside these areas;
- Co-firing of biomass in coal-fired power stations has long since ceased, but the market and technology pull that these examples exerted are now reflected in 20 biomass schemes across the region, of various scales. Significant areas of farmland once devoted to other uses is now given over to the production of energy crops;
- Waste-to-energy schemes have now been rendered redundant by the great and continuing emphasis on waste reduction, re-use and recycling;
- Photovoltaics is now strongly favoured within the domestic sector through the Building Regulations. This maximises uptake and 50% of all new houses between 2010 and 2021 include PV. Strong growth in PV continues to be seen within the commercial buildings sector;
- There are now about 100,000 fuel cell schemes across the region, with domestic, industrial and power-generation schemes all represented;
- Wave energy has now reached greater maturity and a number of large- and small-scale schemes are deployed off the region's coast.

ANNEX C1 REVIEW OF PLANNING AUTHORITY RENEWABLE ENERGY POLICIES

Background

Development plans are prepared by each of the county, unitary and district authorities in the Yorkshire and Humber Region under the terms of the Town and Country Planning Act 1990 (as amended). The plans set out policies on development and the use of land, and identify the main considerations on which planning applications are decided.

In the current planning context, the particular importance of development plans arises from a statutory requirement, introduced by the Planning and Compensation Act 1991, that the determination of individual planning applications should be in accordance with the development plan unless material considerations indicate otherwise. Material considerations are relevant matters relating to the use and development of land. Development plans provide the framework within which development control decisions are made.

Planning Policy Guidance Note 22: Renewable Energy (1993) provides planning policy advice to local planning authorities on renewable energy development. It states that development plan policies should take into account local, regional and national requirements for renewable energy, taking into account that renewable energy sources can, in some cases, only be exploited where they occur. Planning authorities are also asked to bear in mind that investment in renewable energy can make an important contribution to the national economy, and can help to meet international commitments on limiting greenhouse gas emissions.

PPG22 advises that Part I of each UDP (and Structure Plans) should contain general policies and proposals for the provision of renewable energy in their area. Part II of each UDP and local plans should include more detailed policies for developing renewable energy resources. This may include the identification of broad locations or specific sites for particular renewable energy technologies.

Local planning authorities are advised by PPG22 to take into account the need to achieve a balance through the consideration of both "*the immediate impact of renewable energy projects on the local environment and their wider contribution to reducing emissions of greenhouse gases*".

There are two National Parks within the region (although part of the Peak District National Park falls within the region it is not covered by regional planning guidance and hence this study). National government guidance recognises the importance of these and advises that particular care should be taken when assessing proposals for renewable energy in these areas. Similar consideration should be given in other designations including Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest and

areas of archaeological or historic interest and on the coast, of which there are a number within the region.

Regional planning guidance (RPG) will be of increasing importance in providing guidance on how renewable energy development should be planned for, not least because it will in future be expected to set targets for renewable energy use set out in regional sustainable development frameworks. Regional planning guidance for Yorkshire and the Humber (RPG12) has recently been revised with new guidance published in October 2001. Its main purpose is *" to provide a regional spatial strategy within which local authority development plans and local transport plans can be prepared"*. It provides a development strategy for the region to 2016 and beyond. It is intended that this document will inform the development and implementation of other strategies within the region including the region's economic strategy and European Regional Development Fund programmes.

One of the key objectives of the regional planning guidance is to seek the prudent use of natural resources including '*encouraging use of renewable energy sources'*. RPG identifies the national target of 10% of UK electricity being supplied by renewable energy by 2010, subject to the cost to consumers being acceptable. This is supported by Policy S5 that relates to the wise use of non-renewable resources. Local authorities are expected to "*include policies and proposals in their development plans … to achieve at least 10% of energy generation from renewable resources by 2010*" . This is to be accompanied by other energy-related measures including the promotion of energy efficiency.

RPG strongly supports the role of renewable energy in the region through Policy R6. It seeks development plans to include policies to encourage proposals for the use of a wide range of renewable resources. This is, however, subject to such proposals being '*in scale and character with their surroundings'*. Development plans are encouraged to identify locational and environmental criteria that may be applied when considering proposals for renewable energy. RPG also seeks to encourage CHP and community heating and embedded generation where there are areas of demand.

RPG recognises that renewable energy schemes can contribute to reducing greenhouse gases and can also contribute to the region's economy.

Specific support is given for Project ARBRE at Eggborough in North Yorkshire, a biomass plant within the forestry section of RPG. Criteria f) of Policy N4 seeks to provide 2,000 hectares of land for short rotation coppice within 40 miles of the plant.

In addition, in relation to waste there is support for waste to energy incineration, provided that this is set within an integrated approach to waste management that encourages waste minimisation, recycling and reuse. The need to maximise the value recovered from waste through materials recovery including anaerobic digestion and through energy recovery is recognised.

Policies within the recently adopted RPG provide a supportive context for the development of further RE in the region. A more proactive stance towards RE could be achieved through the provision of resource maps within RPG which identify in general terms where particular resources exist. This should be used to inform all those involved in the development of renewable resources of the possibilities within the region. In addition local planning authorities should be encouraged to recognise the equal weight to be attributed to pro-active renewable energy policies and policies of restraint such as those for areas of landscape value and nature conservation sites. There should not be an automatic assumption that renewable energy schemes cannot be accommodated within - for example - areas designated for their landscape value.

Existing development plan coverage in Yorkshire and the Humber

To provide an understanding of the nature and extent of existing planning policy coverage of renewable energy, the project team has examined all 28 unitary development plans (UDP) and local plans in Yorkshire and the Humber. It should be noted that there are four plans relating to East Riding as the district-wide local plan has not yet been adopted. For consistency, the renewable energy content of these plans was appraised against a series of policy quality indicators, summarised below.

Following local government reorganisation North Yorkshire is the only remaining shire county. The North York Moors National Park boundary extends into North Yorkshire. The County Council and the National Park Authority remain therefore the only authorities that produce a separate waste local plan in the region. All other authorities now include waste issues within their UDPs or local plans.

It should be noted that whilst the Humberside Structure Plan has been included within this assessment - as the replacement plans are not yet adopted - the county of Humberside no longer exists due to local government reorganisation.

Policy quality indicators

Development plans and renewable energy: policy quality indicators

- Supporting text of the plan outlines government policy on renewable energy and makes reference to planning policy guidance.
- Supporting text of the plan shows awareness of potential renewable resources in the Plan area and makes reference to a county/regional study where appropriate.
- Supporting text of the plan recognises the balance between potential benefits of renewable energy developments and any adverse environmental impacts that may arise.
- Policies express specific support or encouragement in principle for renewable energy proposals.
- Policies provide clear guidance on the circumstances in which renewable energy proposals will be permitted.
- Policies are phrased so that it is applicable to all renewable energy technologies. No technology is excluded unless fully justified.
- Policies address the development requirements of specific technologies.
- Policies refer to other policies in the plan.
- Policies contain no unrealistic expectations.

The degree to which individual plans perform against these quality indicators was expressed on a simple four-point scale:

- *Excellent*- no amendments or clarification required;
- *Good*- minor amendments would be useful;
- *Satisfactory* - some changes or clarification required;
- *Poor*- major amendments or clarification required.

A summary grade (using the above quality measures) was assigned to each plan to reflect the overall quality of its policy coverage.

Analysis of results
Key findings arising from the policy quality appraisal are as follows:

- *Supporting text of the plan outlines government policy on renewable energy and makes reference to planning policy guidance.*

Only 4% of development plans detail, to a high standard, the government's established policy on renewable energy. 50% provide little or no explanation.

- *Supporting text of the plan shows awareness of potential renewable resources in the Plan area and makes reference to a county/regional study where appropriate.*

Just over a third of plans make reasonable reference to the local potential for renewable energy resources in their area or refer to the LYREPS study carried out in 1997. However, under one third of all plans make little or no reference to such resources or to a regional or local study of available resources.

- *Supporting text of the plan recognises the balance between potential benefits of renewable energy developments and any adverse environmental impacts that may arise.*

Just under one third of all plans acknowledge that there is a balance to be achieved between the potential benefits of renewable energy and the adverse environmental impacts that might arise from such development. Of this amount only 21% are considered to have excellent coverage in this respect. A further 18% make little or no reference to achieving such a balance.

- *Policies express specific support or encouragement in principle for renewable energy proposals.*

93% of plans are considered to contain policies that support the principle of renewable energy development. However, 7% of all authorities in the region have no policy at all concerning renewable energy.

- *Policies provide clear guidance on the circumstances in which renewable energy proposals will be permitted.*

An encouraging 46% of plans provide excellent guidance on the circumstances in which renewable energy proposals will be permitted. A further 39% of plans give some reasonable guidance as the factors or issues that will be taken into account when considering proposals for renewable energy development. In some cases this is quite general.

- *Policies are phrased so that it is applicable to all renewable energy technologies. No technology is excluded unless fully justified.*

Just over two thirds of plans contain general policies of a general nature that can be applied to all renewable energy technologies. However, 18% of plans are considered to fail this criterion indicating either a lack of any policy at all for renewable energy or a lack of a general policy.

- *Policies address the development requirements of specific technologies.*

61% of plans contain technology specific policies, 57% of which were considered to fall within the excellent category. In the majority of cases policies relates to wind developments. It should be noted over one third of plans were considered poor, having no technology specific policies even where resources had been identified as having potential within that authority.

- *Policies refer to other policies in the plan.*

Very few plans reviewed included any cross-referencing between the renewable energy policies and policies contained within other sections of the plan. Only 10% were considered to be either excellent or good. The majority of plans contain no cross-referencing between policy areas.

- *Policies contain no unrealistic expectations.*

Few plans have unrealistic expectations of what renewable energy can achieve although there is little comment as to what most authorities expect can be achieved.

A summary of the results of the analysis of criteria can be found in the table below.

Conclusion

The overall result of the policy quality indicators work is summarised in the table below.

Renewable energy content of unitary development plans in Yorkshire and the Humber: outcome of policy quality appraisal

Grade	Number of plans	Percentage of total
Excellent	1	4
Good	23	82
Satisfactory	3	10
Poor	1	4

Analysis of Planning Authority policies for Renewable Energy

		Percentage of total			
		Excellent	**Good**	**Satisfactory**	**Poor**
1	Supporting text of the plan outlines government policy on renewable energy and makes reference to planning policy guidance.	4	32	14	50
2	Supporting text of the plan shows awareness of potential renewable resources in the Plan area and makes reference to a county/regional study where appropriate.	18	18	36	28
3	Supporting text of the plan recognises the balance between potential benefits of renewable energy developments and any adverse environmental impacts that may arise.	21	11	50	18
4	Policies express specific support or encouragement in principle for renewable energy proposals.	75	18	3.5	3.5
5	Policies provide clear guidance on the circumstances in which renewable energy proposals will be permitted.	46	39	11	4
6	Policies are phrased so that it is applicable to all renewable energy technologies. No technology is excluded unless fully justified.	68	10	4	18
7	Policies address the development requirements of specific technologies.	57	4	4	35
8	Policies refer to other policies in the plan.	10	4	4	82
9	Policies contain no unrealistic expectations.	0	89	7	4

Overall, only one plan was considered to have an excellent planning policy coverage of renewable energy. The majority of plans fall within the 'good' category where amendments to the relevant policies would improve the support for renewable energy in the Yorkshire & the Humber region. One plan was considered to be of poor quality, having no policies for renewable energy. This was the South Humberside Structure Plan which will be replaced by emerging unitary development plans in due course, all of which contain policies for renewable energy.

The policies contained in the plans studied are generally phrased in a positive way towards renewable energy proposals, with many providing a list of criteria or issues that will be taken into account when proposals are considered. There are a reasonable number of plans that contain technology specific policies in recognition of the potential resources in that area.

The main areas of weakness identified by the policy quality assessment are the lack of referencing to existing government policy on renewable energy including limited referencing to Planning Policy Guidance 22: Renewable Energy, and the lack of cross-referencing to other areas of the plan, for example, economic development and fuel poverty.

There is a general lack of awareness of the potential for renewable energy resources in Yorkshire & the Humber with little or no reference to LYREPS.

Good practice
The survey of planning policy for renewable energy has identified a number of authorities within the region that having particularly good policies that may be cited as examples.

Bradford
Bradford's emerging unitary development plan, which had reached first deposit stage in June 2001, was assessed as having an excellent rating under the policy quality analysis detailed above. It was scored as being excellent in seven of the nine indicators, only achieving lower scores in relation to indicators eight and nine.

The Plan sets out in its principal policies contained within Chapter Three, a general policy that "encourages the sustainable and efficient use of the district's natural resources and seeks to encourage the potential of renewable energy".

In the Natural Resources chapter of the Plan it is recognised that climate change represents a huge environmental challenge with the release of carbon dioxide the biggest single contributor to this problem. Renewable energy that reduces or eliminates production of greenhouse gases such as carbon dioxide is therefore seen as making an important contribution to meeting existing commitments to reduce greenhouse gases.

Paragraph 15.37 outlines current government policy on renewable energy, as set out in 'New and renewable energy - Prospects for the 21st century'. This is identified as establishing the target of achieving 10% of UK electricity from renewable sources by 2010. The Plan goes on to note that government guidance on renewable energy is contained in PPG22, which emphasises the importance of "*balancing the need for*

generation of energy from renewable sources with the impact of a proposed development on the local environment". This is considered to meet indicators one and three.

The Plan recognises that within the Borough there is a range of renewable energy resources that could potentially be exploited. Reference is made to the Lancashire and Yorkshire Renewable Energy Planning Study carried out in 1997 and the various resources that it identified within the West Yorkshire sub-region. From this, wind is identified as the area's main resource, for which there has been pressure to develop in the past. However, it states that in order to meet government targets a range of resources should be encouraged. A number of renewable resources are then identified. This text meets indicator two.

Policy NR12 gives general encouragement for the development of renewable resources. Against this general support a number of criteria are to be met. These are:

- There is no significant conflict with other relevant policies in the Plan;
- There is no adverse environmental impact to nearby communities.

The supporting text goes on to specify a range of issues that should be considered in relation to renewable energy proposals and which are covered under other policies in the Plan.

Of particular note, and of benefit to the further deployment of renewable energy, is the latter half of this policy. It states:

"Where a proposal fails to meet these requirements [the criteria noted above] the benefits of the following will be taken into consideration:
(1) The potential contribution to meeting local, regional and national energy needs and reducing global pollution;
(2) The extent to which the development would provide research benefits which would assist the further development of renewable technologies.
In doing so it will be acknowledged that certain renewable energy sources can only be harnessed where the resource occurs."

This policy satisfies indicators four, five and six of the policy quality analysis.

Given that wind energy is seen as the resource that is likely to generate most pressure, the Plan includes a specific policy and supporting text for wind turbine developments. Supporting text identifies the district's attractive countryside, much of which is hilly or upland areas, as one of its main assets. It is recognised that much of the pressure for wind turbine developments is likely to be focussed on such areas. There will therefore be a need to carefully balance the impact of such developments on the character of the landscape against the benefits to be achieved in meeting energy needs.

Paragraphs 15.46 and 15.47 identify some of the issues that should be addressed by any wind turbine proposal and refers prospective applicants to guidance contained within PPG22 and the Council's own *'Supplementary Planning Guidance on Wind Turbine Developments'*.

In light of the above the Plan advises that any wind turbines proposed be sited away from more sensitive areas to areas that may already be adversely affected by man-made intrusion. Policy NR13 states that proposals for wind farms and individual turbines will normally be permitted provided that a range of criteria are met. These are that:

> *"(1) The development will not adversely affect:*
> *(a) The character of the landscape;*
> *(b) Upland or moorland areas which currently have no or little development or contain areas of historical interest.*
> *(2) Special attention is paid to the relationship of proposals to other wind farms/turbines in the areas to prevent over-development;*
> *(3) The development is located sufficiently far away from dwellings to ensure that there are no unacceptable noise problems for local residents;*
> *(4) The siting, design, materials and colour of the turbines and ancillary structures are such that their visual impact is minimised;*
> *(5) The developer undertakes the removal of the structures and full restoration of the site to the satisfaction of the Council, should all or part of the site become non-operational for more than six months.*

The criteria set out above, together with the supporting text to this policy give a clear indication to potential developers of wind turbines as to the issues that the Council will consider in relation to planning applications submitted. It also gives some indication as to the areas of the district that are/not likely to be considered acceptable for wind turbine development. This should assist developers in reducing the time and expense incurred when applying for planning permission for such developments. This policy and supporting text satisfies indicator seven of the policy quality analysis.

Needless to say, early and ongoing consultation with the local planning authority and with the general public is necessary, not just when bringing forward wind turbine developments, but with any proposal for a renewable energy development

Whilst the policies and supporting text contained within the Bradford First Deposit UDP are generally considered to be very good, there is a need for greater linkages to other areas of the plan. Reference to other policies is included in Policy NR12. However, this is phrased in a negative rather than a positive way. Opportunities exist within this policy to include a third consideration within the second half of the policy that refers to the potential benefits that might arise from a development, for example, employment or restoration of contaminated land. Further more detailed consideration of possible benefits from renewable energy schemes could be elucidated within the supporting text.

It is understood that the planning authority is currently considering comments received in respect of the consultation process on the deposit local plan. A response to these comments is being formulated that may result in minor amendments to the deposit plan policies and supporting text.

Scarborough

A large number of development plans within the region were assessed as falling within the good category under the policy quality analysis. Scarborough emerged as being particularly good achieving an excellent score in five of the nine criteria and a good score in two criteria. The remaining two criteria were disappointingly assessed as being poor.

Scarborough's Local Plan was adopted in April 1999. Whilst the Plan recognises that the exploitation of renewable energy can make a significant contribution to the reduction of the emission of greenhouse gases, it also recognises that this potential needs to be reconciled with the need to protect the local environment, thereby satisfying indicator three. There is however, no reference to the overall national planning policy context for renewable energy, including PPG22 and national targets. Thus, the plan fails to satisfy criteria one at all.

The LYREPS study did not extend to cover Scarborough. However, the local plan recognises that there are a variety of renewable resources that could potentially be exploited within the borough. As a maritime authority the potential for wind and wave energy to be utilised is specifically identified. Other resources identified include solar energy, the combustion of crops and forestry products together with geothermal energy, although it is acknowledged that this particular resource remains to be tested in terms of its extent and productivity. In identifying these resources the plan satisfies indicator two.

The Plan contains two policies concerned with renewable energy. The first, Policy E35 Renewable Energy Production is a general policy that supports the development of renewable energy provided that a number of criteria are met. These criteria are:

> *" (A) It will not harm the character or appearance of the landscape; and*
> *(B) It will not harm features of acknowledged importance or otherwise have an adverse effect on the environment; and*
> *(C) It will not harm residential amenity; and*
> *(D) Subject to technical and operational constraints, it is visually related, where practicable, to existing buildings in order to avoid the proliferation of new development in the open countryside."*

This policy generally satisfies indicators four, five and six. As with many criteria based policies these are framed such in a rather negative and restrictive way that does not recognise the potential positive benefits that can arise from renewable energy schemes. These not only include the potential for a reduction in greenhouse gas emissions that contribute to global warming but also through more local benefits such as employment and rural diversification.

The plan recognises that wind energy is a resource that could potentially come forward within the plan area and as such there is a specific planning policy for wind turbine development. Policy E36 supports the development of individual or small clusters of wind turbines, again specifying criteria that should be met by proposals. The criteria are:

> *" (A) No harm will arise through noise, blade rotation or electro-magnetic interference; and*
> *(B) They would not form intrusive features on the skyline.*
>
> *Within the coastal zone, or within close visual proximity of this area or the national park, wind turbines will only be permitted where:*
> *(C) They are designed to serve an existing rural enterprise; and*
> *(D) Cumulatively with other existing or permitted turbines they will not adversely affect the character or public enjoyment of these important landscapes.*

In all cases planning conditions will require the removal of turbines when they become non-operational for a period of six months or more."

The above criteria give some indication as to where proposals for wind turbines will be considered and what considerations will be used to determine their acceptability. Further guidance is given in respect of the impact of wind turbines on important coastal radio installations. Away from the coastline and from the national park (North York Moors) there is less certainty as to what may be accepted by the local authority. Increased guidance would be of assistance to potential proponents of wind turbine developments.

The supporting text Policy E36 states that proposals for large-scale wind development will not be permitted. This is in order that the industrialisation of open landscapes does not occur nor is the enjoyment of such areas by the general public adversely affected. This excludes wholesale the possibility of wind farm developments taking place within the borough, including areas or landscapes that may not be as valued. Whilst it is known that a landscape character assessment has been undertaken previously it is not clear from the Plan whether this forms the basis on which large scale wind proposals have been excluded. Further examination of the potential for the borough to accommodate larger scale proposals may be considered during any review of the local plan.

In respect of indicator eight of the policy quality analysis there is no reference within the policies or supporting text to other policies contained within the plan, whether by way of further criteria that proposals are to be assessed against or areas which proposals could support. Further consideration should also be given to this issue in any future review of the local plan.

Whilst a review of the Local Plan will be taking place it is understood that this will be a partial review to address evolving national planning policy in respect of housing and transport. It is not envisaged that the environment section of the local plan will be reviewed at this stage and therefore the issues highlighted above will not be addressed in the foreseeable future.

Other authorities

The table on the following page shows other authorities that achieved a score of excellent or good in six or more criteria. It also includes a brief indication of the areas that need improvement to achieve a higher score.

The following local authorities have been assessed as achieving a satisfactory rating, where some more major changes and clarification of planning policy are needed:

- Beverley
- Wakefield

The main problems identified from the analysis of these policies, which are common to a number of other local plans, are as follows:

- No reference to national policy context for RE
- Lack of recognition of the balance between potential benefits of RE and any adverse impact
- No technology specific policies

- Lack of reference to other policies in the Plan

Authorities achieving high scores under our review criteria

Hambleton	Lack of referencing to national targets and other national policy No reference to LYREPS or identification of technologies having potential Lack of cross referencing
Holderness	No reference to national policy Balance between the benefits and disbenefits of RE not recognised
Kirklees	Lack of reference to national targets No general policy for renewable energy No cross referencing
Leeds	Limited recognition of balance between benefits and disbenefits of RE Limited direct reference to assessment criteria within the policy No technology specific policies
North Lincolnshire	Limited reference to balance to be achieved Large number of technologies identified as having potential but only one technology specific policy included No cross referencing
Ryedale	No general policy for renewable energy proposals No cross referencing
Sheffield	General reference to balance between benefits and disbenefits Lack of cross referencing

Oldham

Outside of the region the Oldham Unitary Development Plan, First Deposit Draft, October 2001, has been identified as being a particularly good example of planning policies and supporting text for renewable energy. Details of the relevant policies and supporting text are appended at the end of this section.

An assessment of the plan against the policy quality indicators detailed above has resulted in a scoring of excellent against each indicator, with the exception of the first indicator against which the policy was assessed as good. An excellent rating could be achieved in the first indicator by including reference to national policy on renewable energy.

Whilst reference is made to the global benefits of renewable energy reference to the local benefits that may result from schemes is limited. The supporting text could be improved by referring to the wider benefits that can occur at the local and regional level.

Making progress

Examples of good practice and more innovative ways of utilising the planning system to bring forward greater deployment of renewable energy resources have been noted in other parts of England.

Stretching the accepted boundaries of planning policy

The London Borough of Merton has sought to encourage increased provision of renewable energy within the Borough through a proactive planning policy that seeks the

provision of a proportion of the energy requirement of particular developments to come from renewable energy sources. The policy states that:

> *"Policy E.13: Environmental Improvements from Employment Development*
>
> *To achieve environmental benefits from employment developments the council will:*
>
> *(VII) require all new industrial, warehousing and office and live/work developments outside conservation areas and above a threshold of 1,000sq.m to incorporate renewable power generation equipment to provide at least 10% of predicted energy requirements."*

This policy is currently contained within the Deposit Plan that is currently at public inquiry. The policy and in particular criteria vii arises from an objective under the Council's Local Agenda 21 to reduce local reliance on non renewable energy sources. The use of solar power, in particular, is viewed as having potential within the Borough.

It is hoped that by requiring the installation of renewable power generation equipment in larger developments sufficient levels of demand will be generated to enable manufacturers to exploit economies of scale in the production of this equipment. The Council hopes that this will contribute to the creation of a virtuous circle whereby equipment costs decrease and installation of such equipment increases.

A number of different renewable resources are identified as being acceptable sources of renewable energy for the purposes of the above policy. These include photovoltaics, solar-powered and geo-thermal water heating, energy crops and biomass but do not include energy from domestic or industrial waste.

The Council in responding to objections to this proposed policy has indicated in it's Response Proof to the Public Local Inquiry that it considers "*the extension of the use of renewable energy to be as appropriate an aim of land use policy as, for example, employment retention, the protection of wildlife …*". Whilst the Council appreciates that this policy requirement will place significant additional costs upon developments in terms of plant and equipment and space to accommodate it, these cost will only affect new development and will effectively be transferred to the value of development land. As industrial land in Merton is scarce and thus land values 2-4 times that outside London the Council considers that there is no likelihood of negative land values or non-viability of projects. The feasibility of imposing this policy requirement has been tested by the Council through a financial appraisal of a hypothetical development.

Benefits identified as a result of the installation of renewable energy plant include the commanding of higher rents arising from introduction of Climate Change Levy on businesses and the addressing of concerns regarding the security of supply of energy;

By way of support for this policy Merton Council is developing a grant scheme that will provide a further incentive to businesses and developers to install renewable energy generating equipment.

The Council cites Policy INF4 (Energy) of Regional Planning Guidance for the South East in support of its policy. This advises that:

> *"Using their development control and building regulation processes, local authorities should seek to influence the design of new development to incorporate use of appropriate renewable energy heating or power systems."*

In the same way Policy S5 of Regional Planning Guidance for Yorkshire and the Humber can be used to support the inclusion of similar policies to that outlined above in the development plans of local authorities in the Yorkshire and Humber region.

The use of development briefs

In Bedford, a development brief has been prepared for the Elstow New Settlement that includes provision for '*technical efficiency in siting, design and use of materials'*. This is to include:

- The preparation of an energy strategy that identifies measures and targets for minimising energy consumption including building grouping and orientation, building form, thermal insulation and ventilation and choice of materials and use of recycled materials.
- The investigation of alternative energy systems including individual systems i.e. condensing boilers, super insulation, photovoltaics and central plant such as gas boilers, waste to energy, biomass and combined heat and power.

The development brief was drawn up largely by the Joint Venture partners (National Power Plc and Gallagher Estates) in the project together with Bedfordshire County Council, Mid Bedfordshire District Council and Bedford Borough Council. Bedford Borough Council, as the local planning authority sought the inclusion of a requirement for the submission of an energy strategy and it is understood that the project partners were happy to accept its inclusion. This particular case study illustrates the need for co-operation and consultation between the principal stakeholders in a development if renewable energy is to be brought forward. The importance of a positive reaction to the planning authority's desire to incorporate energy as an issue in the development, including renewable energy, cannot be underestimated. Had one or more partners in the project not been prepared to 'sign up' to this idea a different outcome may have been achieved.

An outline planning application for the core part of the site was submitted to Bedford Borough Council in November 1999. The site comprises 300 hectares of land. The proposal includes the development of four villages and a main centre, incorporating housing, retail centres, business, general industrial and storage and distribution premises. The applicants have submitted an energy strategy in line with the requirements of the development brief. The Council has not yet made a decision but it is expected that members will consider the application in early 2002.

The use of conditions

Bedford Borough Council has also used conditions to ensure that photovoltaic units will be installed at a new 250 home development at Clapham Folly in the town. In this case the developer, a commercial housing developer, had proposed the inclusion of PV within the scheme. In order to ensure that this part of the project was implemented a condition requiring the installation of PV units on a minimum of six houses was imposed.

This scheme has the benefit of a DTI Domestic PV programme grant. Persimmon Homes intends to promote the PV option in one of its show homes. However, it should be noted that the developer has indicated that those homes with PV only remain commercially viable due to the grant obtained.

PPG22

It is recognised by this and other regional studies that current planning policy guidance on renewable energy is outdated and in need of revision. Significant technical progress has been made in many technology bands and there has been a general shift in national planning policy. This is particularly so given the publication of the Green Paper on proposed reforms to the planning system in December 2001.

It is understood that consultation with relevant organisations and with interested parties has recently begun such that a draft revised version of PPG22 will be published during 2002. The importance of PPG22 in providing the national planning policy context for renewable energy cannot be underestimated. It has been clearly shown through revisions to PPG3 and PPG13 that shifts in the national context of particular issues can have a fundamental effect on development proposals coming forward. Careful thought must therefore be given to the revised PPG giving clear guidance that will ensure that local planning authorities take a positive approach to renewable energy provision.

Planning Green Paper

As noted above the Planning Green Paper was published at the end of 2001. It identifies a number of problems inherent in the current planning system that are of relevance to the further deployment of renewable energy. These include:

- *Complexity* - Planning is considered to be too complex, remote, hard to understand and difficult to access.
- *Speed and Predictability* - Planning is often perceived as preventing development rather than ensuring that good development goes ahead.
- *Community Engagement* - Although the current system is 'consultative' it too often fails to engage communities.

A number of fundamental changes are proposed that will affect the way in which renewable energy proposals are considered. Whilst the ‘plan-led’ system is to be retained it is proposed that it will have a new form. This would involve the abolition of Structure Plans, Local Plans and Unitary Development Plans, to be replaced with a single tier of plan, the ‘Local Development Framework’ (LDF).

Local Development Frameworks would consist of a Statement of Core Policies setting out the local authority's vision and strategy together with more detailed Action Plans for smaller areas of change. A map showing existing designations and the areas of change for which action plans would be prepared is also proposed. Decisions about planning permission should be made in accordance with the Statement of Core Policies, and Action Plans where these are considered relevant. LDFs are to inform and be informed by Community Strategies that all local authorities now have a duty to prepare.

Core policies are to be updated continuously such that LDFs remain consistent with national and regional policies. This will hopefully ensure that the revision of, for example, PPG22 will be quickly and effectively translated down to local authority level.

Whilst the Green Paper does not envisage that Action Plans would be subject based to any great extent there is an opportunity for energy plans to be prepared that would incorporate renewable energy as a key component. Other important elements that will need to taken forward include energy efficiency and demand management. Such issues may be best approached from a more strategic perspective.

The role of County Councils in respect of minerals and waste is expected to remain. Waste related planning applications including landfill gas and waste to energy schemes will continue to be determined by County Councils.

The importance of community involvement is recognised and it is proposed that the Statement of Community Involvement would set out how the community would be involved both in the review of the LDF, and in commenting on significant planning applications. In the case of large developments it is proposed that compliance with the Statement should be a material consideration supporting a planning application. Opportunities for community participation in the consideration of applications for renewable energy schemes should be enhanced, thereby ensuring that there is increased ownership of such schemes.

It is proposed that the role of regional planning policy be strengthened. Regional Planning Policy Guidance would be replaced with Regional Spatial Strategies (RSS) that would be statutory in nature. They would be integrated with other regional strategies, for example, the regional sustainable development frameworks that place considerable emphasis on renewable energy. These would provide a strategic framework for LDF's and Local Transport Plans.

As part of the Green Paper it is also proposed to introduce new parliamentary procedures for the processing of major infrastructure projects. These are intended to streamline the overall handling of such projects reducing unnecessary delays whilst safeguarding public involvement. It is intended that the Secretary of State would have discretionary powers to decide to which projects these procedures will apply having regard to the specific nature and circumstances of the project concerned. It is anticipated that these will generally be schemes of national importance. The precise way in which it will be decided whether projects fall to be determined under the proposed procedures is not yet known. It is therefore difficult to determine what type and how many renewable energy projects might fall to be determined under the procedures. Similarly, the details of actual process of determining a planning application are not yet determined and it remains to be seen whether this will be a help or a hindrance to the development of further renewable energy generation.

The fundamental review of the planning system presents an opportunity to raise the profile of renewable energy as an important consideration, particularly in view of the government’s increasing commitment to its promotion. There is a need for recognition that national and regional targets can only be achieved if the planning system takes a more positive stance towards renewable energy. This must be achieved both through a top down

and bottom up approach, thereby providing direction and commitment from national government and engagement and adoption from local government and communities.

Oldham Replacement Unitary Development Plan - First Deposit Draft, October 2001

ENERGY POLICIES

13.50 Today's lifestyle is heavily dependent upon fossil fuels as a source of heat and energy. We can reduce our consumption of fossil fuels simply by using less, increasing the efficiency of our consumption, for example by using energy saving light bulbs, making short journeys on foot rather than by car and switching to renewable sources of energy.

13.51 The consumption of fossil fuels has led to problems on an international scale, namely global warming and climate change. The Government's draft UK Programme for Climate Change 2000 states that some climate change is now inevitable because greenhouse gases such as carbon dioxide have already accumulated in the atmosphere. The UK will be affected by rising sea levels, temperatures increases and more extreme weather, changes that will have an impact on health, lifestyle and on the environment and economy. A national target has been set that by 2010, 10% of the UK's electricity should be supplied from renewable sources, subject to the costs to consumers being acceptable. In 2000 this percentage figure stood at around 2.5%.

13.52 There are a number of ways in which land use planning can influence greenhouse gas emissions. This section focuses on the role of planning policies in determining Oldham Replacement Unitary Development Plan - First Deposit Draft, October 2001 applications for the development of plants that generate electricity and/or heat from renewable sources.

13.53 Governmental guidance, PPG22* - "Renewable Energy" advises every local authority to consider the contribution that their own area can make towards meeting energy requirements on a local, regional and national basis. At present there are two main sources of information on renewable energy resources in Oldham: the Lancashire and Yorkshire Renewable Energy Planning Study (LYREPS) carried out by Terence O'Rourke plc and the Energy Technology Support Unit and published in 1999; and the North West of England's regional renewable energy study from March 2001. The former attempts to quantify the resources available while the latter sets regional targets for renewable energy capacity to be achieved by 2010, based on an assessment of available resources and constraints.

13.54 According to the LYREPS, Oldham's current known resources are as follows: Short term (to 2005): solar, municipal and industrial waste, biomass, wind, landfill gas and small scale hydro; Longer term (to 2025): solar, biomass, municipal and industrial waste, wind, and small scale hydro.

13.55 Two factors may affect the situation in the Borough as presented in the LYREPS Study. Oldham already generates energy from landfill gas at Chadderton and it is now proposed to introduce a similar scheme at High Moor Quarry which would have an anticipated thirty year lifespan. Even bearing in mind the shift of emphasis away from landfill as a waste management option, sites that accept pre-treated

biodegradable waste will still exist and be suitable for gas to energy schemes, making it a viable resource for both short and longer term use. In the case of waste incineration, it has not yet been determined at sub-regional level whether the need exists for additional capacity within Greater Manchester and if so, where this should be located. An emerging resource that the LYREPS study did not investigate is coal bed methane. Although the use of this resource is in its infancy, it could become a significant source of energy in areas, like Oldham, where coal exists.

13.56 The North West Regional Assembly has developed targets to increase the exploitation of renewable sources in the region by 2010. Those which Oldham could play a part in achieving as additions to the existing regional capacity include:

a. 5 medium scale windfarms (10 - 20 turbines), 10 wind clusters (4 - 10 turbines) and 10 or more single large turbines;
b. 3 large and 6 small CHP/electricity plants using energy crops and forestry residues;
c. 4 anaerobic digestion plants fuelled by farm gas;
d. 2,300 domestic, 80 commercial and 20 motorway photovoltaic installations;
e. 14 small scale hydro schemes;
f. 20 CHP/electricity plants using landfill gas; and
g. 4 to 12 CHP/electricity plants using municipal or industrial solid waste

PART 1 POLICY

ENERGY DEVELOPMENTS

NR3 THE COUNCIL WILL SUPPORT DEVELOPMENT PROPOSALS WHICH IMPROVE ENERGY EFFICIENCY AND CONSERVATION AND FOR FORMS OF ENERGY GENERATION WHICH CONTRIBUTE TO REDUCING GREENHOUSE GAS EMISSIONS, SUBJECT TO CONSIDERATION OF THEIR POTENTIAL ENVIRONMENTAL AND HEALTH IMPACTS.

13.57 The Council aims to encourage renewable energy developments as part of its broader strategy to tackle carbon dioxide reduction, but will not accept proposals without careful consideration of their possible impact on the local environment and on health. Policies to encourage energy efficiency in new developments are contained in Section 3, Design.

13.58 The following detailed policies set out first, broad criteria for all renewable energy developments and secondly, because of their particular characteristics in relation to location, specific additional criteria for the development of wind turbines.

PART 2 POLICIES

Renewable energy developments

NR3.1 Renewable energy developments will be permitted where the development and any ancillary facilities or buildings would not create a hazard or nuisance that could not be overcome and would not have an unacceptable

impact on any of the following:

a. residential amenity and human health;
b. the character or appearance of the surrounding area;
c. the openness and visual amenity of the Green Belt;
d. public access to the countryside;
e. sites designated for their nature conservation value;
f. the biodiversity of the Borough;
g. sites or buildings of cultural, historical or archaeological interest; and
h. ground and surface water quality and air quality.

Permission will only be granted if any unavoidable damage that would be caused during installation, operation or decommissioning is minimised and mitigated or compensated for. Applications must indicate how this will be achieved.

13.59 This policy is intended to apply to all renewable energy technologies including wind turbines. The Council supports the use of renewable energy sources subject to other UDP policy considerations. Apart from their obvious role in reducing greenhouse gas emissions, resources such as biomass* and wind farms may also provide opportunities to diversify the rural economy.

13.60 The Council recognises the global benefits of renewable energy and, therefore, takes a generally positive approach to such development, but it also acknowledges the need to balance these benefits with the potential impacts on local health and environments. Renewable energy resources can usually only be developed where they occur and some degree of impact may be unavoidable, however, this may be considered acceptable because it is minor, because mitigation measures may be put in place, or because it is outweighed by the wider global benefits.

13.61 The criteria relate generally to all forms of renewable energy. A separate policy on wind turbines is required to deal with their unique locational requirements and potential effects, including visual impact, electromagnetic interference and low frequency noise.

Wind turbines

NR3.2 The development of wind turbines will be permitted, provided that all the following criteria are satisfied:

a. the proposed development will not cause unacceptable harm to any of the following:
i) the landscape, through the number, scale, size and siting of turbines, impact on the skyline, cumulative impact or the need for new power lines for connection to the electricity supply grid;
ii) highway safety; or
iii) existing transmitting or receiving systems;
b. the proposed development will not lead to significant nuisance to the public arising from noise, shadow flicker, electromagnetic interference or reflected light;

c. in the case of proposals within or having an impact on habitats of international or national importance or adjacent to the Peak District National Park, the applicant can show that there is no other suitable site and that any harm to the habitat or to the objectives of the National Park likely to be caused by the proposed development would not be significant;
d. the proposed development would be at least 500m from any sensitive existing land use, for example housing, schools or hospitals, other than by the express agreement of all the relevant parties;
e. the proposed development accords with the renewable energy policy NR3.1; and
f. redundant turbines, plant, transmission lines and access roads will be removed and the sites restored.

13.62 This policy for wind turbines is considered necessary because wind energy can only be exploited where wind speeds are sufficiently fast. By its very nature, the wind resource is likely to be greatest in upland areas, which are sensitive in terms of landscape and nature conservation value and are likely to be highly visible from some distance.

13.63 Draft Regional Planning Guidance requires development plans to include critieria based policies for the development of renewable energy resources that should aim to protect the region's most valuable and sensitive environments.

13.64 This policy aims to ensure that the siting of turbines would not affect highway safety by distracting or blinding drivers. In some cases the Council may negotiate for the provision of viewing points, as wind turbines sometimes attract sightseers and the lack of such provision could adversely affect road safety.

13.65 The scale of these developments must be carefully considered along with any cumulative effects, for example where other wind farms are also visible in the vicinity, and the impact made not only by the turbines but by any ancillary development, for example grid connections and access tracks, that may be needed.

13.66 The South Pennines Heritage Landscape Countryside Design Summary recognises the sensitivity of upland landscapes and any impact on these must be very carefully assessed. Applications will be considered in the context of the SCOSPA Inter-Authority Memorandum on Wind Farms.

13.67 Applicants for planning permission will be required to:

a. identify all viewpoints from which the wind turbines would be visible and provide visual aids such as photo montages to assist the assessment of their impact; and
b. provide sufficient information to allow the potential impacts to be judged.

ANNEX C2 REVIEW OF LA21 / COMMUNITY PLAN STRATEGIES

Introduction

To gain further insight into the extent of renewable energy policy coverage at the local level, the project team has reviewed the Local Agenda 21 (LA21) strategies in the Yorkshire and Humber region.

LA21 is an initiative that arose out of the 1992 Earth Summit in Rio de Janeiro. It is a recognition that over 60% of the actions needed to improve our management of the world's resources need to happen locally. It is a process of developing local policies for sustainable development and building partnerships between local authorities and other sectors to implement them. Thus, it provides an opportunity for the local community to work together on local issues that also affect the global environment.

All local authorities in the UK are encouraged to prepare strategies; the Prime Minister issued a challenge that these should have been in place by the year 2000. In the Yorkshire and Humber region, as elsewhere, the strategies are at various stages of preparation and review. As each document is based on the local context their scope and content varies from authority to authority.

LA21 review assessment

Six review criteria have been used to assess each of the LA21 strategies of the Yorkshire and Humber region. Each of the criteria represents a differing aspect of how renewable energy policy may be approached. If a LA21 strategy is acceptable under the criteria (see below), then it was deemed to have 'passed'. Otherwise, a "fail" was awarded if the strategy did not satisfy the criteria's specifications. Ideally, a LA21 strategy would pass all six of the criteria, but this was rarely the case.

Note that attempts to 'score' or rate a LA21 strategy under each of the criteria was avoided as it was deemed to be too subjective, particularly given the local emphasis of these strategies and the inherent variation with LA21 documents.

Renewable energy policy

This criterion was designed to assess whether the LA21 strategy specifically addresses the issue of renewable energy. Issues such as energy conservation and energy efficiency, whilst being beneficial topics, are not considered to be sufficient to address renewable energy in the context of this assessment.

Specific objectives

A 'pass' for treatment of this criterion was awarded if a LA21 strategy specifically states objectives relating to renewable energy, e.g. "The Community Environment Centre at St Nicholas's Field, situated on an old tip, will produce all its own energy through renewable methods" (York's LA21 plan, Improving the Quality of Life in York…Are You Doing Your Bit? 2000).

Quantified targets

Targets are a vital tool for implementing any policy or objective. Quantification further enhances this tool. These targets must relate to renewable energy e.g. "10% of electricity supplied from local renewable sources by 2010" (Kirklees Agenda 21 Action Plan and Vision: Our Agenda to Change, 2000).

Technology specific policy
There are many forms of renewable energy, each with its own attributes. A policy or statement specifically addressing a technology e.g. "use developing technology to generate energy from gases produced at more landfill sites" (North Yorkshire's LA21 strategy, Towards a Sustainable Future, 2001).

Local initiatives
This refers to the development of partnerships with elements of the local community, be they businesses or community groups e.g. the Heeley City Farm Energy Project (Sheffield's LA21 Plan, Our City – Our Future, 2000).

Monitoring
The last criterion asks whether there are proposals for a formal monitoring programme examining renewable energy related data e.g. "reductions in CO_2 emissions by 30% from 1990 levels" (The Council's Response to the [Ealing] borough's LA21 Community Document, Lets Improve Our Quality of Life, 1998).

Results
The table below shows the results of the LA21 assessment carried out using the above criteria.

Analysis of results
Each of the six review criteria was looked at in turn to determine whether a pass or fail had been achieved by each local authority. Although there are 26 districts within the Yorkshire and Humber region, not all of the local authorities produce Local Agenda 21 Documents or Community Plans. These districts have thus been omitted from evaluation. It was decided that for the Yorkshire and Humber region as a whole to be awarded a pass for any single review criteria, at least 50% of the local authorities must have achieved a pass in that criteria. In line with this assessment standard, the Yorkshire and Humber region was awarded a fail for the renewable energy policy content of its LA21 documents.

A renewable energy policy
With regard to criteria one – a renewable energy policy – 35% of the LA21 plans made reference to a renewable energy policy and thus 35% of the districts passed this criteria.[21]

[21] There were instances whereby a district had produced both an LA21 Document and a Community Plan. In these instances, both documents were assessed for renewable energy strategies and therefore the number of plans passing a criteria could potentially differ to the number of authorities passing a criteria. Since this difference did not occur, there is no further need to make a distinction between the plan and the authority and so from here on, reference will be made solely to the percentage of authorities passing a review criteria.

REVIEW OF CURRENT LA21 PLANS ACROSS YORKSHIRE & THE HUMBER

District	Document Title	Date	Renewable energy policy	Specific objectives	Quantified Targets	Technology specific Policy	Local initiatives	Monitoring
Barnsley	Barnsley Metropolitan Borough Council Community Plan	2000	✔	✗	✗	✗	✗	✗
	Barnsley and the Environment, Local Agenda 21 Action Plan	1996	✗	✗	✗	✗	✗	✗
Bradford	Community Plan 1997-2000 'Working Towards a Sustainable Bradford District'	1997	✗	✗	✗	✗	✗	✗
Calderdale	Calderdale Community Strategy, Draft no.1 21 for 21: A Plan for Living by Common Sense	2001	✗	✗	✗	✗	✗	✗
Craven	Local Agenda 21 Strategy – 2000/2001 and Beyond	2001	✗	✗	✗	✗	✗	✗
Doncaster	Draft Community strategy – 'Doncaster Achieving Our Full Potential'	2001	✔	✗	✗	✗	✔	✗
East Riding	Local Agenda 21 Plan	2000	✗	✗	✗	✗	✗	✗
Hambleton	Local Agenda 21 Strategy		✔	✔	✔	✗	✗	✗
Harrogate	Harrogate District Agenda 21 Plan: Think Global, Act Local	1999	✗	✗	✗	✗	✗	✗
Humberside	Do not produce LA21 strategy or Community Plan. County has disbanded.		–	–	–	–	–	–

Kingston-upon-Hull	Kingston upon Hull City Council Local Agenda 21 Strategy		✗	✗	✗	✗	✗	✗
Kirklees	Kirklees Agenda 21 Action Plan 2000 (includes supporting document 'Vision: our agenda for change')	1999	✔	✔	✔	✔	✔	✗
Leeds	Leeds Local Agenda 21 Draft Strategy Statement and Action Plan	2000	✗	✗	✗	✗	✗	✗
North East Lincolnshire	'Agenda 21 and Sustainable Development Strategy'	2000	✗	✗	✔	✗	✗	✗
North East Lincolnshire (Great Grimsby)	Do not produce LA21 strategy or Community Plan.		–	–	–	–	–	–
North Lincolnshire	The North Lincolnshire Jigsaw, You and Local Agenda 21	2001	✗	✗	✗	✗	✗	✗
North York Moors National Park	Do not produce LA21 strategy or Community Plan.		–	–	–	–	–	–
North Yorkshire	Local Agenda 21 strategy – 'Towards a Sustainable Future.'	2001	✗	✗	✗	✔	✗	✗
Richmondshire	LA21 Strategy	2000	✗	✗	✗	✗	✗	✗
Rotherham	Draft Local Agenda 21 Plan	2000	✔	✗	✗	✗	✗	✗
Ryedale	Environmental Action in Ryedale – Local Agenda 21	2000	✗	✗	✗	✗	✗	✗

Scarborough	Local Agenda 21 Strategy – 'Working towards a better future'	2001	✔	✗	✗	✗	✗	✗
Selby	Local Agenda 21 "A Quality of Life Strategy"	2000	✗	✗	✗	✗	✗	✗
Sheffield	'Our City – Our Future' Local Agenda 21 in Sheffield	2000	✔	✗	✗	✗	✔	✗
Wakefield	The Wakefield Community Strategy – an invitation to contribute	2001	✗	✗	✗	✗	✗	✗
York	Improving the quality of life in York .. . … are you doing your bit ?	2000	✔	✔	✗	✗	✔	✗
Yorkshire Dales National Park	Do not produce LA21 strategy or Community Plan.		–	–	–	–	–	–

The prime cause for a district's failure to meet the specifications of this criteria can be attributed to the number of instances whereby attention was given to energy efficiency and/or energy conservation yet a distinct failure to address renewable energy as a separate resource was recorded. As previously outlined, renewable energy differs from energy conservation and efficiency measures.

A second reason for this is the tendency of local authorities to outline the science behind renewable energy but fail to follow this up with any policies or specific objectives. Often examples of regional initiatives are cited but intent for similar local initiatives and solid policies is unfounded.

Specific objectives
Only 13% of the local authorities outlined specific objectives in relation to renewable energy and were thus awarded a pass.

Aside from a total failure to address the issue of renewable energy, the most significant reason for failure of this criteria can be related to the lack of detail within objectives. Objectives rarely stated what was intended and simply made reference to the concept of renewable energy. For example, Barnsley has an objective to "…support the increasing use of renewable energy resources" (Barnsley's Community Plan, 2000). Clearly this is not specific enough and does not outline how such renewable resource use will be increased.

Quantified Targets
Of the 23 plans assessed, 13% were awarded a pass for this review criterion.

In a few examples, although performance indicators were stated, the documents failed to outline targets and timescales. For example, Kirklees LA21 document has a performance indicator for the generation of electricity by hydro-electric turbine plants at weirs on the Calder River. Setting a quantified target and timescale is required here.

Technology specific policy
In relation to this fourth review criterion, only 9% of the local authorities had made reference to a technology specific policy in their LA21 documents.

Although renewable energy was often cited, rarely were specific policies or objectives outlined and even rarer were policies or objectives that went beyond the broad renewable energy concept so as to detail specific technologies, other than simply naming them. Occasionally, reference was made to past projects and initiatives that were technology specific, but such information was not followed through into local policies or objectives drawing on such technological examples. York's LA21 document, for example, only makes a passing reference to Harewood Whin which produces power from landfill gas. Whilst Kingston Upon Hull's LA21 Strategy makes reference to an arable biomass plant at Eggborough, this is not a policy and is purely illustrative.

Local Initiatives
The local authorities performed marginally better in relation to the fifth criterion, with 17% being awarded a pass for inclusion of local initiatives.

In some instances, local initiatives involving energy efficiency or energy conservation measures were cited to the exclusion of those involving renewable energy sources. Such an example can be found in East Riding of Yorkshire's LA21 plan where there is significant focus upon promoting energy efficiency through a number of initiatives, for example, the Old Goole Community Project which runs seminars for local residents on tackling energy efficiency and fuel poverty. However, no examples of renewable energy initiatives are highlighted.

Monitoring
Every one of the local authorities failed to make reference to the monitoring of renewable energy schemes within their LA21 strategies. Monitoring was occasionally mentioned but only with reference to energy efficiency.

Conclusions
Given that a substantial number of LA21 documents were awarded a fail in accordance with each of the review criteria and that a score of 50% or more was required for the region as a whole, the Yorkshire and Humber region failed to pass any of the review criteria for the renewable energy content of their LA21 documents. The results of this assessment are summarised in the table below.

In terms of the overall success of individual local authorities, the results from the six review criteria awarded for each associated plan were combined to calculate a score out of six. A score of three or more was awarded a pass; below three was considered a fail. In respect of this, only two authorities passed and could thus claim to have a good LA21 strategy in terms of renewable energy. These were Kirklees Agenda 21 Action Plan and York Local Agenda 21 Plan.

SUMMARY OF LA21 CONTENT FOR YORKSHIRE & THE HUMBER

	Renewable energy policy	**Specific objectives**	**Quantified Targets**	**Technology specific Policy**	**Local initiatives**	**Monitoring**
% passing criteria	35%	13%	13%	9%	17%	0%
Performance of Yorkshire and Humber Region	Fail	Fail	Fail	Fail	Fail	Fail

Best Practice examples in LA21

During the review of the LA21 strategies, a number of examples of 'best practice' coverage of renewable energy issues were uncovered.

Policy structure formulation process
This approach to renewable energy policy formulation is based on quantifying the objective, setting deadlines and allocating resources to achieve the objective. A good example of this is found in Kirklees LA21 Action Plan (2000). The Action Plan is combined with a supporting vision and strategy document, which contains targets for action. Within this supporting document emphasis is placed upon renewable energy in the section entitled 'A community with a good environment and more sustainable way of life.' Within this section of the LA21 strategy, there are eight overall objectives, one of which is to reduce greenhouse gas emissions.

This section is further sub-divided into five *actions*. Three of these address renewable energy. Action 1 aims to "*Establish a European funded energy agency – Kirklees Energy Services – to promote energy efficiency and renewable energy within Kirklees*". Action 4 shall "*Develop local renewable energy projects"*. Action 5 intends to *"Develop additional Combined Heat and power units and utilise heat from Waste to Energy Plant"*. Renewable energy policy can also be found in the main document – the Local Agenda 21 Action Plan – under the Energy section.

Action 4 is a good example of policy formulation. Based on the *policy statement*, it is followed by a *target* with a *timescale*, which in this case *is "10% of electricity supplied from local renewable sources by 2010*". The lead agencies involved in achieving this target are the Environment Unit (Kirklees Metropolitan Council), Yorkshire Electricity, and Environmental Services (Kirklees Metropolitan Council). The policy does, however, lack specific indicators, although a number are outlined in the accompanying document, the Local Agenda 21 Action Plan. This approach ensures that the stated policy has a significant chance of being successfully implemented as most of the key issues (resources, timescale and indicators) are examined during the policy formulation process.

Education and training
Educating and informing all members of the public plays a vital part in ensuring that renewable sources of energy are used to a greater extent. Sheffield City Council's LA21 document, Our City- Our Future (2000) outlines an ongoing Council initiative to train Council Staff on energy awareness through schemes such as the 'Carbrook Energy initiative' and the 'Energy User Cruiser'.

Technology Specific Policies
Kirklees Local Agenda Action Plan and Vision provides a good example of a technology specific policy, referring to specific forms of renewable energy. As mentioned above, Action 5 aims to "*Develop additional Combined Heat and power units and utilise heat from Waste to Energy Plant*". Reference is also made to Port Calder, a major housing development, where it is hoped that the development will feature the largest photo-voltaic solar panel in the UK.

Quantified targets/indicators

The use of quantified targets allows the success of the policy to be monitored and managed. Kirklees Local Agenda Action Plan and Vision incorporates a number of targets into its actions. Action 1 aims to establish a European funded energy agency by March 2000. Action 4 sets out provide 10% of electricity from local renewable sources by 2010 through local renewable energy projects. Action 5 aims to establish district heating and CHP schemes by 2005. Hambleton District Council's LA21 strategy aims to research, report and recommend the most appropriate form and application of renewable energy for all council buildings by April 2002. It also aims to report on options for the purchase of green energy by July 2001 with a decision on purchase by October 2001.

Local Initiatives

There are a number of examples of local initiatives incorporated into the LA21 documents that can be identified as examples of best practice. Sheffield City Council is working in partnership with the voluntary sector, Housing Associations and other authorities to promote energy awareness, such as the Heeley City Farm Project, wind and power displays and REINSULATE, a community enterprise specialising in home insulation. Doncaster's draft LA21 plan, 'Doncaster Achieving Our Full Potential' (2001) makes reference to research that is being carried out in partnership with the Earth Centre and Sheffield Hallam University to look at developing a blueprint for the production of renewable energy for the benefit of the community.

ANNEX C3 NFFO REPORT

Introduction

The Electricity Act 1989 provided, amongst other things, a means by which public electricity suppliers are obliged to secure specific amounts of power from non-fossil fuel sources, including renewables. Through the Act a number of Renewables Orders have been made, with this system operating as the Non Fossil Fuel Obligation (NFFO) in England and Wales. The Order established a market for renewable energy.

A number of schemes in Yorkshire & the Humber have been brought forward under the encouragement of NFFO. The first tranche of NFFO commenced in 1990. There have been a further four rounds, with NFFO5 (the last tranche) commencing in September 1998. Projects contracted through NFFO receive a premium price for the electricity generated for a defined period up to 15 years. This arrangement provides certainty for developers and investors. NFFO contracts were tendered on a competitive basis and thus the system has encouraged a steady reduction in the price of electricity from renewable sources, such that some technologies are close to being competitive with fossil fuel sources.

NFFO is soon to be replaced by a new Renewables Obligation, the operation of which has been the subject of consultation by the DTI. This will require electricity suppliers to supply a specified proportion of their electricity supplies from renewable sources.

NFFO contracted schemes in Yorkshire and the Humber

There are 791 NFFO contracted schemes in England & Wales. The total capacity[22] of contracted schemes in England and Wales is 3229.214MW of which 320 schemes are operational (40%). The contracted capacity of these schemes is 802.605MW, representing 25% of total contracted capacity.

There are a total of 75 NFFO contracted schemes in the Yorkshire & Humber region (9.5%) with a total contracted capacity of 288.608MW (8.9% of total for England and Wales). The contracted capacity of one scheme is not known.

Planning position

Since the introduction of NFFO, planning permission has been granted for 40 schemes across the region, and one scheme did not require express consent by virtue of permitted development rights. There are two schemes that are currently the subject of a planning application. Both applications were submitted a number of years ago and it appears unlikely that they will be determined in their current form. Six schemes have been refused planning permission. The table below illustrates the current planning position by Borough.

[22] The Non-Fossil Fuel Obligation adopted an alternative convention for the expression of RE scheme capacity, using MW_{DNC} (Declared Net Capacity) as its measure. Declared Net Capacity relates RE energy output to that of conventional power production plant and for some RE technologies MW_{DNC} is lower than "ordinary" MW, by a "DNC factor". The key technology affected by this within the confines of NFFO is Onshore Wind Energy (DNC Factor = 0.43). Therefore all NFFO capacities discussed within Annex C3 should be read as MW_{DNC}. All other Sections within this report utilise "ordinary" MW.

Local Planning Authority	Total number of schemes	Number of schemes approved	Number of schemes refused
Barnsley	4	2	2
Bradford	3	3	0
Calderdale	7	3	1
Craven	1	1	0
Doncaster	6	3	0
East Riding	12	1	2
Hambleton	2	1	0
Harrogate	5	4	0
Kirklees	6	4[1]	1
Leeds	6	5	0
North East Lincolnshire	2	2	0
North Lincolnshire	5	3	0
North York Moors National Park	1	0	0
Richmondshire	1	0	0
Rotherham	2	0	0
Ryedale	1	1	0
Scarborough	1	1	0
Selby	2	1	0
Sheffield	4	4	0
Wakefield	4	2	0

[1] – Includes one scheme for which planning permission was not required.

It can be seen that there is a concentration of schemes in West Riding with large numbers of schemes in Calderdale, Doncaster, Kirklees and Leeds. The nature of these authorities differs and consequently the technology of schemes lying within these areas also differs. In East Riding there is a concentration of wind schemes reflecting the topography of the district such that viable wind speeds are found. Similarly in Calderdale there is a preponderance of wind schemes. In Doncaster and Leeds there is a concentration of landfill gas and other waste related technologies. This may reflect the generally urban nature of the area and also the previous history of mineral extraction. A variety of technologies are to be found in Kirklees.

Planning permission has been sought from a wide range of local planning authorities. Over 50% of schemes have now been granted planning permission. It is notable that planning permission has not be sought for many schemes in Calderdale, Doncaster and East Riding, three of the authorities noted above as having large numbers of schemes. In particular planning permission has been sought for only three of the 12 schemes in East Riding.

The table below illustrates the current planning position by technology.

Technology band	Total number of schemes	Number of schemes approved	Number of schemes refused
Landfill Gas	33	24	1
MIW	7	4	0
Sewage Gas	1	0	0
Energy Crops & Agric-ultural & Forestry Waste	4	2	0
Hydro	4	2	0
Wind	26	8	5

It can be seen that landfill gas schemes, for which there are few planning problems, have made significant planning progress. In contrast wind schemes, which make up a significant proportion of the overall number of schemes in the region have not made such good progress and have the highest number of schemes refused planning permission.

There are 22 operational schemes with an operational capacity of 58.489MW (1.8% of total operational in England and Wales). This represents 29% of the number of schemes or 20% of the operational capacity operational in the Yorkshire & Humber region.

Technology band
The table below shows the number and contracted capacity of NFFO schemes in each technology band.

Technology band	Total number of schemes	Contracted capacity (MW)
Landfill Gas	33	80.155
MIW	7	76.35
Sewage Gas	1	20.9
Energy Crops & Agricultural & Forestry Waste	4	15.1
Hydro	4	1.031
Wind	26	95.072

Landfill Gas
There are 33 landfill gas schemes with a total contracted capacity of 80.155MW. This represents 28% of the total contracted capacity in the region. Of this 13 schemes are operational with a total contracted capacity of 21.818MW. This constitutes 27% of capacity in this technology band.

MIW
There are seven MIW schemes with a total contracted capacity of 76.35MW. This represents 26.6% of total contracted capacity. Two schemes are operational with a total capacity of 15.6MW. This constitutes 20% of capacity in this technology band.

Sewage gas
There is one sewage gas scheme in the region with a contracted capacity of 20.9MW. This represents 7.3% of the region's capacity. The scheme is not yet operational.

Energy crops & agricultural & forestry waste
There are four schemes with a total contracted capacity of 15.1MW. This represents 5% of the total contracted capacity in the region. One scheme is currently operational and has a contracted capacity of 8.0MW. This constitutes 53% of contracted capacity in this technology band.

Hydro
There are four hydro schemes with a total contracted capacity of 1.031MW *(capacity not known for one scheme).* This represents 0.36% of the total contracted capacity in the region. One scheme is currently operational, the contracted capacity of which is not known.

Wind
There are 26 wind schemes in Yorkshire & the Humber with a total contracted capacity of 95.072MW. This represents 33% of the total contracted capacity in the region. Five schemes are currently operational with a contracted capacity of 13.071MW. This represents 13.7% of capacity in this technology band.

County
The tables below show the number of schemes, contracted capacity, number of operational schemes together with the operational capacity by County (former county areas)

South Yorkshire ....

Total number of schemes – 16
Total contracted capacity – 30.507MW

	No. of schemes	**Contracted capacity (MW)**	**No. of operational schemes**	**Contracted capacity (MW)**
Landfill Gas	7	8.138	3	3.133
MIW	3	16.35	1	2.1
Sewage Gas	0	0	0	0
Energy Crops & Agricultural & Forestry Waste	0	0	0	0
Hydro	1	0.2	0	0
Wind	5	5.819	2	2.576

West Yorkshire ....

Total number of schemes – 26
Total contracted capacity – 101.307MW

	No. of schemes	**Contracted capacity (MW)**	**No. of operational schemes**	**Contracted capacity (MW)**
Landfill Gas	14	41.057	6	10.072
MIW	1	7.5	0	0
Sewage Gas	1	20.9	0	0
Energy Crops & Agricultural & Forestry Waste	0	0	0	0
Hydro	2	0.386 1 unknown	1	Unknown
Wind	8	31.464	2	9.295

North Yorkshire ....

Total number of schemes – 14
Total contracted capacity – 38.679MW

	No. of schemes	**Contracted capacity (MW)**	**No. of operational schemes**	**Contracted capacity (MW)**
Landfill Gas	5	11.678	1	2.376
MIW	0	0	0	0
Sewage Gas	0	0	0	0
Energy Crops & Agricultural & Forestry Waste	4	15.1	1	8
Hydro	1	0.445	0	0
Wind	4	11.456	1	1.2

Humber ....

Total number of schemes – 19
Total contracted capacity – 118.115MW

	No. of Schemes	**Contracted capacity (MW)**	**No. of operational schemes**	**Contracted capacity (MW)**
Landfill Gas	7	19.282	3	6.237
MIW	3	52.5	1	13.5
Sewage Gas	0	0	0	0
Energy Crops & Agricultural & Forestry Waste	0	0	0	0
Hydro	0	0	0	0
Wind	9	46.333	0	0

The table below shows the distribution of NFFO contracted schemes by local planning authority and their respective contracted capacities.

Local Planning Authority	Total number of schemes	Contracted capacity (MW)
Barnsley	4	5.725
Bradford	3	1.975
Calderdale	7	27.055
Craven	1	1.2
Doncaster	6	6.964
East Riding	12	71.042
Hambleton	2	1.1
Harrogate	5	8.565
Kirklees	6	17.469
Leeds	6	30.197
North East Lincolnshire	2	3.086
North Lincolnshire	5	43.987
North York Moors National Park	1	6
Richmondshire	1	6.371
Rotherham	2	1.31
Ryedale	1	0.058
Scarborough	1	1.33
Selby	2	14.055
Sheffield	4	16.508
Wakefield	4	24.611

In terms of contracted capacity it can be seen that East Riding, North Lincolnshire and Leeds make significant contributions to the region's total renewable energy capacity. In East Riding this reflects not only the large number of schemes in the district but also the presence of a number of large wind schemes and a MIW scheme. Leeds has a large sewage

treatment works that contributes a significant proportion of it's contracted capacity whilst North Lincolnshire has two large MIW schemes.

NFFO Tranches
The table below illustrates the progress of schemes by NFFO tranche.

Tranche	No. of Schemes	Contracted capacity (MW)	No. of operational schemes	Contracted capacity (MW)
1	4	23.9 1 unknown	4	23.9 1 unknown
2	12	34.151	7	7.521
3	10	22.672	5	18.068
4	27	77.167	2	5.092
5	22	130.718	4	3.908

As would be expected schemes in the earlier NFFO rounds have progressed to a greater extent than those more recent schemes. It is noted that the number of schemes has increased as each tranche has come forward. Earlier rounds do not, therefore, contribute large amounts of contracted capacity.

We have undertaken a review of planning policies across the region, summarised within Section 4 of this report. In parallel, we have analysed some of the issues arising from planning policy implementation, in respect of those schemes that have not obtained planning approval. This analysis is presented here as part of a regional baseline assessment.

Six NFFO contracted schemes have been refused planning permission. These are:

Landfill Gas

Cromwell Bottom Landfill Scheme	Calderdale	NFFO4	0.97MW

Wind

Century Steels Windfarm	Barnsley	NFFO2	1.677MW
Dry Hill Farm Wind Farm	Kirklees	NFFO2	0.168MW
Hepworth Clay Pipeworks Wind Farm	Barnsley	NFFO3	1.472MW
Sober Hill Wind Farm	East Riding	NFFO3	0.639MW
Eastfield Farm Wind Farm	East Riding	NFFO4	4.902MW

Reasons for refusal

An analysis of the reasons for refusal of the above schemes has been carried out to identify whether there are common issues that need to be addressed to ensure greater deployment of renewable energy in the region in the future.

Cromwell Bottom Landfill Scheme
A planning application for the installation of a network of underground pipework and above ground well heads to collect landfill gas, connected to a generator, was submitted by Energy Development Ltd to Calderdale Metropolitan Borough Council (MBC) on 30th June 1997.

Shortly after commencement of landfilling part of the site was designated by the Council as a Site of Ecological or Geological Interest. This was to ensure that species were retained and wildlife refuges created. The Council considered this site an important ecological site with a range of species found in very few parts of the District.

The site falls within the Green Belt although planning officers considered that the proposal would not conflict with PPG2 objectives (to retain the openness and visual amenity of the Green Belt). The above ground structures were considered essential facilities necessary to support the main use of the site and therefore not contrary to local plan policies concerning Green Belt.

The main issue in respect of the proposal related to ecological considerations. After careful balancing the issues the planning officer concluded that whilst the constructions works necessary would have a short-term adverse effect on ecology this would not be of such a duration or extent that refusal of the application would be justified. Conditions, in line with those suggested by English Nature and the Ecological Advisory Service were considered necessary to ensure that the ecological impact of the proposal was minimal.

The proposal was recommended for approval subject to conditions. However, members disagreed with the report and refused the proposal on 2nd July 1999. They considered the proposal inappropriate development that would harm the quality of the Cromwell Bottom Site of Ecological or Geological Interest within which part of the application site was located. There was particular concern regarding the extent of disturbance to ecological interests that would arise from the installation of the gas collection system. The proposal was considered to be contrary to Policy N56 of the UDP that concerns the impact of proposals on sites of ecological and geological importance.

Comment
The Cromwell Bottom Landfill Gas scheme is unusual being the only landfill gas scheme to have been refused planning permission. As can be seen from the details above the primary issue of concern to the Council was the nature conservation interest of this particular site. It is clear that no general issues arose that would prevent the development of landfill gas schemes generally.

Century Steels Windfarm
Barnsley Borough Council refused planning permission for the Century Steels Windfarm scheme on 3 February 1994. It was refused principally on the grounds of visual intrusion and adverse impact on the residential amenity of adjacent properties.

An appeal was subsequently lodged. The Inspector identified two main issues:

- The effect of the proposal on the appearance and public enjoyment of this expanse of countryside;
- The effect of the proposal on the amenity of those living nearby, by reason of visual intrusion and noise.

In considering the appeal the Inspector took account of the Council's policies in respect of renewable energy. In particular he highlighted Policy ES9's emphasis on the importance of

landscape considerations in determining wind proposals in Areas of Borough Landscape Value. He also noted that whilst Policy ES10 identified the appeal site as within an 'area of search' for wind power proposals, the Council had resolved to delete this policy from the Deposit Unitary Development Plan as a result of representations received. Accordingly, the Inspector stated that he accorded this policy little weight.

Whilst the Inspector accepted that the location of the proposal would restrict long range views, he concluded that the visual dominance of the wind turbines within distant, mid-range and nearby vantage points would harm the appearance of this area of countryside. This impact was considered within the context of the designation of the site and surrounding area as Green Belt and an Area of County Landscape Value.

The Inspector also acknowledged that this area is a well-used recreational resource with extensive rights of way over the moors, some of which are within the adjoining National Park. He considered that the proposal would "*diminish the public enjoyment of this tract of countryside*".

The Inspector also considered that the proposal, when viewed with the 13 existing turbines at Royd Moor, that are 2km from the site, would dominate the landscape in and around the Don Valley.

In considering the impact of the proposal on local residents the Inspector noted that the site is in an area of relatively low-lying land that is fairly well populated. He concluded that the number and height of the turbines would visually dominate views from the closest properties and that the motion of the turbine blades would also have a significant visual impact. Concern was also expressed about the impact of shadow flicker and noise on adjoining properties.

In addition to the primary issues above the Inspector noted that the Borough Council had cast doubt as to the amount of electricity that would be generated by the proposal. This was on the basis that Department of Trade and Industry wind speed measurements were below those of the appellant and that the appellant's survey was carried out in the winter when wind speeds are likely to be highest. The contribution of the proposed wind farm to reducing global warming was therefore also questioned.

The Inspector concluded that the concerns identified above outweighed other evidence submitted to and heard at the appeal and subsequently dismissed the appeal.

<u>Dry Hill Farm Wind Farm</u>
Planning permission for the erection of a single wind turbine at Dry Hill Farm Wind Farm was refused on 3rd April 1991. Kirklees Metropolitan Council considered that the proposal would, by virtue of its size, height and location, be an unacceptable feature in the Special Landscape Area within which it was proposed. It was also considered detrimental to the visual and rural amenity of the area.

An appeal was submitted against this decision. The Inspector in considering the appeal had regard to draft PPG on Renewable Energy and to Kirklees' Interim Policy on Wind Turbine but considered that, given their status rendered them subject to alteration, only limited weight could be afforded to them.

The Inspector disagreed with the Council's view that the proposal constituted inappropriate development in the Green Belt. He considered, in relation to Green Belt policy guidance, that wind turbines fall within 'other uses appropriate to a rural area' as by their nature they require open exposed locations, that by necessity, must include rural areas. He also considered that the design and materials of the turbine would be appropriate in this part of the countryside. However, he went on to express concerns about the prominent siting of the wind turbine within a Special Landscape Area. The Inspector also considered that the natural beauty and visual amenity of the Green Belt would be adversely affected by the proposal. The wind turbine would be viewed mainly against the skyline and would be an obtrusive feature in this natural landscape.

The Inspector concluded that whilst every consideration had been given to the benefits of the scheme these were outweighed by the visual harm that a turbine of the height proposed and in the location proposed would have on the visual amenities of the Green Belt and Special Landscape Area. The appeal was therefore dismissed.

Hepworth Clay Pipeworks Wind Farm

Barnsley Borough Council refused planning permission for six wind turbines at Hepworth Clay Pipeworks Wind Farm in June 1995. The Council considered that the scale of the turbines and their siting in a prominent location, designated as Green Belt and a Borough Landscape Value, would significantly and adversely affect the visual character of the landscape. It also considered that turbines would adversely affect the amenities of adjacent residents. The contribution of the scheme to clean energy was not considered to outweigh the substantial environmental and residential impacts of the scheme.

An appeal was lodged in 1996. The Inspector acknowledged that the site was suitable for a windfarm in terms of its technical requirements and that a connection to the electricity grid was available on site.

He identified three primary considerations:

Whether the proposal was appropriate to the Green Belt, and if not, whether there were special circumstances to justify the granting of planning permission;
The likely effect on the character and appearance of the countryside;
The likely effect on the amenities of adjacent residents.

The Inspector noted that the turbines would be seen in whole or in part from many parts of the surrounding countryside, including the Peak District National Park. He also noted that from some viewpoints the existing Royd Moor wind farm could also be seen. He concluded that the size, scale, shape and movement of these large turbines would be uncharacteristic of the generally rural character and appearance of the locality. Consequently he considered that the character and appearance of the Area of Borough Landscape Value within which the scheme would be located would be adversely affected to an unreasonable extent. The proposal was considered to unacceptably injure the visual amenities of the green belt.

Whilst the Inspector gave weight to the need to develop sources of renewable energy where they occur he did not consider that this provided the very special circumstances such that planning permission should be granted.

With regard to adjoining property the Inspector considered that the wind turbines would dominate the horizon. Their size and almost continuous movement was considered to be detrimental to the amenities of adjacent residents. Whilst the appellant had offered to screen the view of the turbines by planting areas of trees the Inspector was not persuaded that this would be adequate given the environment into which they would be planted.

In dismissing the appeal in December 1996 the Inspector stated that he had given substantial weight to the utilisation of the wind resource at the site. However, a number of factors outlined above had outweighed this consideration.

Sober Hill Wind Farm

An application for six wind turbines at North Newbold was submitted to Beverley Borough Council in September 1995.

The planning officer's report identifies the following as the primary considerations in respect of this proposal:

Accordance with development plan policy;
Effect on visual amenity;
Effect on residential amenity;
Impact on the character and amenity of the countryside;
Sustainability and conservation of resources

The site was located within open countryside where local plan policies aim to restrict new development to that essential to agriculture or other uses appropriate to a rural area. It was also located in an area of high landscape value in the draft local plan where development may be permitted subject to there being no adverse impact on the special character, appearance or nature conservation value of the landscape.

The report considered that site was prominently located and highly visible from both the local and more distant area, ensuring that the turbines would be visually prominent within the landscape. It was not accepted that, given the presence of existing pylons and overhead cables, the turbines would blend into the existing landscape.

The officer's report recognises the need to weigh the desirability of exploiting clean and renewable energy against the visual impact on the landscape of wind proposals as set out in PPG22. It goes on to acknowledge that the scheme has a NFFO3 contract and to identify the contribution that the scheme would make to the renewable energy target for wind turbines set out for the Yorkshire Electricity area.

It was accepted that there would be no demonstrable harm due to noise nor would there be an adverse effect on birds or other wildlife in the area. The comments of representors in respect of potential safety issues associated with broken blades were not accepted.

The report concluded that whilst renewable energy power generation from wind turbines was supported in principle, this site was not considered appropriate for such development due to the special quality of the landscape and the impact of the turbines on the visual amenities of the area. It was considered that the weight attached to the benefits derived

from the scheme was not sufficient to override "*the strong objections on visual amenity grounds*".

Planning permission was refused in December 1995 for the following reasons:

"1. The proposed development, by reason of the prominent location of the site and the size, design, height and nature of the turbines would seriously detract from the character and appearance of the area, to the detriment of visual amenity.
2. The site lies within an area of high landscape value as defined in the Draft Beverley Borough Local Plan and the proposed development would conflict with the policies of that plan which seek to conserve the special character and appearance of the landscape."

Eastfield Farm Wind Farm
Planning permission for thirteen 1MW wind turbines at Eastfield Farm Wind Farm was refused by East Riding of Yorkshire Council on 22nd July 1999. The Council also refused planning permission for schemes at Out Newton and Outstray Farm at this meeting.

Whilst it was accepted that there is a need for wind proposals to meet national and international targets for renewable energy and to contribute to sustainable development local concerns were considered to outweigh this.

The Council had particular regard to a report aimed at assisting with the assessment of the impact of wind proposals in the Holderness landscape. This concluded that the within the local landscape the Eastfield Farm proposal would become the overwhelming dominant element, altering the existing landscape substantially. It was also considered that the impact of the Eastfield Farm scheme when combined with either of the other schemes being considered would be significant.

The Council refused the scheme for the following reasons:

"(i) The proposed development because of its size and scale would be visually dominant and cause substantial and unacceptable visual impacts upon property, footpaths and roads within the vicinity of the site and could not be successfully accommodated within the landscape character of the area in conflict with policy U19(4) of the Adopted Holderness District Wide Local Plan 1999.
(ii) The proposed development would have an adverse impact on the setting of Partington Parish Church, a Grade I listed building which is a dominant landmark in the area and would unacceptably damage existing views of the church in conflict with policy U19(2) of the Adopted Holderness District Wide Local Plan 1999.
(iii) The applicant's proposals do not demonstrate that adverse impacts on nature conservation interests of acknowledged importance will be minimised in conflict with Policy U19(2) of the Adopted Holderness District Wide Local Plan 1999 and Policy En4 of the Approved Humberside Structure Plan 1993.
(iv) It is not considered that the environmental benefits of the scheme, including the reduction in greenhouse gases, outweigh these adverse environmental and visual impacts."

Renewable Energy Systems Ltd lodged an appeal against the decision. The appeal was heard together with that for Out Newton (4.5km away) at a joint public inquiry on 22nd February 2000. Prior to the appeal reason (iii) above was withdrawn by the Council.

The Inspector considered that the principal matters for consideration were:

The effect of the proposal on the landscape and the living conditions of local people;
The balance between the acknowledged benefits of wind energy and the adverse environmental and visual impacts of the proposals;
The cumulative effects of the proposals on the landscape and living conditions of local residents.

The Inspector concluded that there would be a 'substantial and dramatic' change to the character of the landscape, which is flat, open and agricultural in nature, as a result of the proposed wind farm. He considered that there was general agreement that the effect within 2km of the proposal would be significant but that the appellant had underestimated the impact on the landscape at greater distances. The Inspector concluded that, due to the degree of change and general lack of mitigation, the proposed wind farm would become a prominent and often dominant feature, eroding the simplicity and openness of the open farmland landscape type within which it would be located.

Whilst impact on the outlook from residential properties in a number of locations had been identified by the appellant as significant, the Inspector considered that this judgement should be extended to a wider area. He also considered that the wind farm would dominate the local scene from local views, to a greater degree than purported by the appellant. It was not considered, however, that the enjoyment of public rights of way would be seriously impaired.

The Inspector considered that special regard should be paid to the desirability of preserving the setting of Partington church, a Grade I listed building. He concluded that the presence of wind turbines within the wider landscape view of the church would compete in scale and extent, and contrast in form with it. In many cases the wind turbines would 'become the new centre of attention'. He concluded that "*the landscape around Partington is particularly sensitive to change due to the pre-eminence of the spire and its supremacy in the landscape*". The wind farm would therefore have a damaging effect on the church.

It was not considered that the setting of the various conservation areas in the vicinity would be adversely affected although it was noted that the setting of one area would be affected by the proposal.

Whilst bird population and migratory movement was recognised to be a significant factor in the area, give the presence of the Humber SPA, the Inspector accepted that there would not be a significant effect on bird populations.

Whilst interference to television reception and noise were issues of particular concern to representors to the inquiry, it was considered that any problems could be addressed through conditions and remediation, and neither was considered to be a significant issue. The Inspector did not consider that the proposal would deter visitors or weaken the tourist based local economy. He also considered that there was an insufficient basis on which to conclude that there would be an adverse effect on the local housing market generally or to the extent that there would be social or economic decline.

Whilst there was some dispute at the inquiry as to the benefits to be achieved from this proposal the Inspector concluded that the serving of almost 40% of homes in the locality of Eastfield Farm with energy was a not insignificant contribution. The construction and operational benefits were, however, considered to '*play little part in the overall balance'*.

The Inspector concluded that a windfarm of the scale proposed would have '*an imposing and damaging presence over a wide area'*. Whilst not damaging the setting of Patrington Church there would be significant visual harm to important views of the church. There would also be visual harm to the character and appearance of the landscape, to road users and an adverse impact on local residents, contrary to policies contained within the local plan. These impacts would not be outweighed by the benefits identified.

The Inspector went on to consider the cumulative impact of the proposal with that at Out Newton. He noted the existence of a number of landscape studies that provide guidance as to the ability of the landscape to accommodate wind turbine proposals. He concluded that even if both proposals were found to be acceptable individually, their cumulative impact, both in terms of landscape impact and effect on residential properties, roads and settlements, would be unacceptable.

The Secretary of State, on the basis of the Inspector's recommendation, dismissed the Eastfield Farm appeal but upheld the appeal on the neighbouring Out Newton scheme on 11th September 2000.

Comment
A number of common issues arise in respect of the five wind farm schemes examined above including landscape impact, Green Belt and impact on local communities.

In the case of the Eastfield Farm scheme the applicants had chosen this site, taking into account the Council's landscape character assessment for wind proposals and other factors. The site fell within the landscape character report type identified as having a moderate capacity to accommodate development up to the scale of a large wind farm. Notwithstanding this, both the Council and the Secretary of State considered this particular site unsuitable for such a development due to impact on the surrounding landscape.

Where proposed wind farms have been sited within areas designated for their landscape value, this has been taken particular account of, even if only locally designated. In each case concern has been raised as to the impact on the character and appearance of these areas.

The issue of the acceptability of siting wind farms in Green Belts is raised by both the Dry Hill Wind Farm and Hepworth Clay Pipeworks Wind Farm schemes. In the former case the Inspector disagreed with the Council’s view that the proposal constituted inappropriate development in the Green Belt. He considered, in relation to Green Belt policy guidance, that wind turbines fall within ‘other uses appropriate to a rural area’ as by their nature they require open exposed locations, that by necessity, must include rural areas.

In the case of Hepworth Clay Pipeworks Wind Farm the Inspector considered the proposal both in terms of the purposes of including land within Green Belt and the types of development considered appropriate to Green Belt. Whilst he concluded that the proposal

fell within 'other uses of land which preserve the openness of the Green Belt' he went on to say that the wind turbines would be so conspicuous that they could be legitimately regarded as encroaching into the countryside. This would be contrary to one of the purposes of Green Belt.

These two appeals give conflicting messages as to the acceptability of locating wind farms within Green Belt in terms of the uses that are acceptable under national policy guidance. Whilst this sample is very small there may be a need for clearer guidance on as whether, in principle, wind farms are acceptable within Green Belt.

In each of the cases examined, the Inspector has gone on to assess the acceptability of the proposal in terms of its impact on the Green Belt. In each case this has been found to be unacceptable due to visual impact and impact on character.

The impact of schemes on local residents is an issue identified in four of the five wind schemes examined. Visual impact is of particular concern, with issues of noise, shadow flicker lesser concerns.

Whilst in many cases the benefits of each scheme, particularly in terms of their contribution to local electricity requirements and the need to utilise wind resources where they occur, had been taken into account in all cases this was considered to be outweighed by the local impacts of schemes.

Pre-planning difficulties
The first table of this section shows that 41 schemes have been granted planning permission. There are a further 25 schemes for which planning permission has not yet been sought. A brief examination of the history of these schemes suggests that perceived difficulty in obtaining planning permission is not the only reason why schemes are not brought forward. The following list provides a brief summary of other issues identified by NFFO contractors as to why schemes have not been progressed:

- Contracted company has gone into receivership;
- The original contracted company has been sold and timescales subsequently altered;
- Difficulty in obtaining project funding;
- Concentrating on other NFFO contracted projects;
- Lack of waste contract necessary for scheme to be brought forward;
- Insufficient or poor quality of gas at landfill site;
- Protracted discussions with site owners

Post-planning difficulties
In addition to those schemes that have not entered the planning system there are 13 schemes for which planning permission has been granted but schemes have not been brought on line. As above there are a variety of reasons for this (some of which are also noted above) although issues associated with planning are rarely a problem. These include:

- Access problems to weir;
- Death of contractor;
- Difficulty in obtaining finance for scheme;

- Sale of the original contracted company and subsequent alteration of timescales;
- Contamination of gas;
- Cost and difficulty of obtaining grid connection to scheme;
- Difficulties with site owner negotiations.

Conclusion

There are a relatively large number of schemes having NFFO contracts within the region. Of these planning permission has been granted for 40 schemes and one scheme did not require express consent by virtue of permitted development rights. Six schemes have been refused planning permission.

There is clearly a concentration of schemes within the landfill gas and wind technology bands. This is likely to reflect the nature of the region, having both large urban areas and old mineral workings together with upland areas suitable for energy generation from wind.

There are 22 operational schemes with an operational capacity of 58.489MW, representing 20% of the capacity in the Yorkshire & Humber region. Many of these are within the landfill gas technology band where schemes are less controversial from a planning perspective and simpler to implement from a practical point of view. Both municipal industrial waste and wind schemes, which represent significant contracted capacity, have a tendency to be controversial and this may reflected both in the number of schemes refused planning permission and the number that have entered the planning system.

ANNEX D1 STAKEHOLDER BRIEFING MATERIAL

BACKGROUND BRIEFING FOR CONSULTATION

What are the objectives of UK Government policy towards renewable energy?
The UK's broad overall policy approach to renewable energy (RE) is set out within "New and Renewable Energy- Prospects for the 21st Century: Conclusions in Response to the Public Consultation (Feb 2000)". The Government's RE policy has five key aims:

- To assist the UK to meet national and international targets for the reduction of emissions including greenhouse gases;
- To help provide secure, diverse, sustainable and competitive energy supplies;
- To stimulate the development of new technologies necessary to provide the basis for continuing growth of the contribution from renewables in the longer term;
- To assist the UK renewables industry to become competitive in home and export markets and in so doing provide employment; and
- To make a contribution to rural development.

What is the objective of this study?
The Government has set a target that 5% of UK electricity requirements should be met from RE sources by the end of the year 2003 and 10% by 2010. Ministers agreed that a strategic approach to RE provision needed to be developed at the regional level as a key mechanism for translating the targets into suitable development on the ground. It was proposed that assessments of each region's capacity to generate electricity from RE sources be undertaken, and that these should lead to the production of renewable energy generation targets that can be related to the UK's overall 'electricity supply from renewables' target. PPG 11 "Regional Planning" and the Department's advice on "Preparing Regional Sustainable Development Frameworks" indicate how the outputs of such work will be reflected in RPG and the Sustainable Development Frameworks.

This study sets out to provide a regional assessment of RE capacity (primarily for electricity production) and to recommend targets for the region to adopt for 2010 and beyond, to 2021. In doing so it is seeking to consult as widely as possible to ensure that the targets derived have the widest possible measure of support.

What is renewable energy?
Renewable energy sources are those which are continuously and sustainably available in our environment, such as wind and solar energy. This definition is often extended to include sources such as geothermal energy, which is not strictly speaking a continuously available resource. In addition, the Government is seeking to encourage new energy technologies (e.g. fuel cells) that can convert energy from a chemical reaction directly into low voltage direct current electricity and heat.

The list of sources that we are considering within this study is shown below:

- Wind energy (onshore / offshore)
- Biomass sources (existing wood & new "energy crop" sources / straw / farm wastes (e.g. animal manure))
- Small-scale hydro power
- Solar energy technologies (photovoltaics / solar water heating / passive solar design)
- Waste-to-energy (landfill gas / municipal waste combustion / sewage gas)[23]
- Fuel cells
- Wave and tidal energies
- Geothermal energy

[23] The status of waste-to-energy technologies is of course a matter for debate. The Government takes the view that landfill gas and sewage gas should both be eligible for inclusion within the new Renewable Energy Obligation (see description of the Obligation overpage). Only the "non-fossil" energy output from the incineration of waste is considered to be eligible within the Renewables Obligation. From the point of view of this study, we ask consultees to accept these classifications, but would like to seek your views on these classifications and how the study should present these sources within the report.

Current and future sources of Government support for renewable energy deployment

A number of sources of support for RE have been – or are being – introduced by the Government and its agents to encourage a major increase in the current level of deployment (which currently stands at ca. 3% of electricity-generating capacity nationwide). The key elements of this are as follows:

- The prospective Renewable Energy Obligation (RO)[24], which will place an obligation upon licensed suppliers of electricity in Great Britain to source specified – and growing - amounts of electricity from renewable sources;
- The exemption of renewable electricity from the Climate Change Levy;
- Direct packages of financial support worth over £260 million over the next few years;
- Freedom for the previous generation of Non-Fossil Fuel Obligation (NFFO) projects to move location, where required to overcome planning difficulties;
- A regional approach to planning and targets for renewable energy (of which this study is an example);
- DEFRA has made available establishment grants for energy crops through the England Rural Development Programme;
- The Countryside Agency's Community Renewables Initiative, which is currently setting in train a major new approach to the encouragement of community-scale projects;
- The Carbon Trust is currently developing its future policies towards the encouragement of renewable energy and it can be anticipated that these will be in place soon.

Further Briefing

For further briefing on the study or the characteristics of different RE sources, please also refer to the project web-site, www.etsu.com/y&hre-study/.

Glossary

Energy technology, in common with other scientific disciplines, uses a variety of terms which help to describe the status and characteristics of particular technologies. A brief glossary may help to illustrate these terms.

MW (Megawatt) : A unit of power, which indicates a capacity to generate energy. Large wind turbines have a capacity of about 1 MW or more.

1 MegaWatt = 1000 kiloWatts = 1,000,000 Watts

These power units above do not indicate how efficient a technology will be at producing energy, but are more an indication of scale. In addition, solar photovoltaic technology uses the suffix "p" in conjunction with its power rating (e.g. kW_p), to reflect the "peak" power of a PV installation under defined standard conditions.

GWh (Gigawatt-hour) : A unit of energy, used to show how much energy is actually generated.

1 GWh = 1000 MWh = 1,000,000 kWh

If a 1 MW installation was 100% efficient and ran throughout a year without stopping, it would generate 8760 MWh (8.76 GWh) of energy. In practice, all energy technologies are much less efficient than this, for example a 1 MW onshore wind turbine might generate around 2800 MWh per year. Such an energy output can be very dependent upon context, e.g. wind speed characteristics, turbine technical specifications, required stoppages for maintenance, etc.

[24] "New and Renewable Energy: Prospects for the 21st Century – The Renewables Obligation Statutory Consultation", DTI, (August 2001)

STAKEHOLDER FEEDBACK

This consultative document and the material that has been presented (see www.etsu.com/y&hre-study/) offer an initial view of the technologies available for the development of renewable energy across Yorkshire and the Humber to 2010, and beyond to 2021. This in turn raises a range of different and often challenging issues for the region to consider. In developing scenarios for further discussion, we would welcome your views on these issues.

To assist us in taking account of your comments, it would be appreciated if consultees could frame their written contributions largely within the structure of the following questions. We do not interpret these questions to have single "right" or "wrong" answers – therefore we would value any contributions that you can make even if you have little specific knowledge in particular areas.

1. ***What renewable energy projects do you or your organisation know of within the region? What is your opinion of them? What examples of "best practice" do you or your organisation know of, whether within the region or elsewhere?***

2. ***The Government has set a target that 10% of national electricity needs could be provided from renewable energy sources by 2010. Based on the need for the region to make a contribution towards this target, and the briefing material showing other regions' prospective targets and their composition, what level of electricity generation from renewable energy by 2010 could Yorkshire and the Humber aim for and why?***

3. ***What 'mix' of renewable energy types, sizes and numbers would you like to see for achieving this target and why? How large a contribution should each form of renewable energy make to a target (i.e. 'small', 'substantial' or 'as large as possible')?***

4. ***In addition to their energy-producing (and greenhouse gas reducing) potential, renewable sources may have other advantages (e.g. rural diversification, job creation) or disadvantages (e.g. visual impact). In achieving the electricity generation target from question 2 above, how can the region seek to maximise these benefits and minimise any drawbacks?***

5. ***Where, in your view, should different forms of renewable energy schemes be located within the region (in broad terms) and why? (please refer to environmental character[1] and broad locations such as industrial, urban, town/village setting, open agricultural land, sparsely populated countryside, coastal areas). What do you feel are the key constraints or opportunities within these areas?***

6. ***Does your organisation have a policy in relation to renewable energy development? If so, please describe it or - if possible - append (including LA21 / community plans). How do you envisage that this policy will help to deliver a prospective renewable energy target for Yorkshire and the Humber?***

7. ***In addition to your policy (Q6) what actions will your organisation take to help deliver a renewable energy target across the region? What actions should central government and other regional organisations (e.g. Government Office, Yorkshire Forward, the Yorkshire and Humber Assembly) take?***

8. ***How should the planning system deliver renewable energy targets?***

9. ***What do you expect this study to establish and why? What should it lead to next?***

10. ***Any other comments you wish to make (including the methodologies employed, availability of improved data)?***

You may also find it useful to refer to the Briefing Document, and the resource maps, which show the distribution of potential renewable energy resources across Yorkshire and the Humber. These can be viewed on the study's website *[www.etsu.com/y&hre-study/].*

Initial responses to this document are requested by 31st October 2001 to assist us to develop further consultation material**.** It would be very helpful if responses are concise. You may wish to concentrate on particular areas of interest or expertise in your reply.

Please note that we will not be able to reply individually to comments received, and that all responses will be made available to members of the Study Steering Group. Responses may be incorporated into the final report where appropriate.

Please send your comments (preferably by e-mail) to:

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ANNEX D2 LEEDS INTRODUCTORY SEMINAR 11TH OCTOBER 2001

SUMMARY

44 people and organisations attended this initial event held at the Leeds Town Hall on 11th October 2001.

The event focused initially on giving information and briefing the audience in the following aspects of the study:

- International policy background (Kyoto, climate change issues)
- National Targets and Obligations in respect of renewable energy
- Regional framework and context provided by, e.g., Regional Planning Guidance and the Regional Sustainable Development Framework
- Local context and issues
- Renewable energy – descriptions, resource methods
- Environmental and planning considerations, policy analysis
- The process of consultation and timetable
- Requests for feedback and stakeholder inputs

Delegates were given a pack of information containing a Background Briefing & Resource Method Document and Feedback instructions. This information and the presentations were placed upon the project web-site www.etsu.com/y&hre-study/.

Following this initial briefing, three breakout discussion workshops were held, to provide an opportunity to review the information provided and to provide initial stakeholder input.

These discussions are summarised below.

GROUP A (Blue Breakout Group)

Facilitator: Les Saunders GOY&H
Rapporteur: John Callaghan AEAT

Key points arising from the discussion are summarised below

TARGETS

1. All agreed each part of region should make some contribution to the RE target - but which type/sort of RE and how much depends on location.
2. No! to centrally derived targets - got to come from bottom up on what areas can deliver
3. Got to have community involvement and ownership of any target or proposal
4. Needs to be consumption not generation.

NEED FOR WIDER DEBATE

1. Need for all to be clear on why we need any RE target & for what purpose. What is RE? and agreement on which elements are, or are not, renewable.
2. A long debate about wastes and whether they should be classed as RE or not. Some say that waste-to-energy must have a role, there anyway so use them. Others disagree and say that EfW (including landfill) should not be "automatically" classified as RE. They say that to do so is not to have completed the discussion about what IS Renewable energy!
3. Agree no parachuting in or imposition on areas (see planning discussion below)
4. Agree that RE lends itself to small scale local schemes that minimise transport costs

TYPES OF RE

1. Some stakeholders are not keen on wind (except offshore) and possibly no to biomass (because of landscape implications)
2. Landscape issues and perceptions of noise could affect views of viable technologies
3. A view that EfW should not be included. However overall mixed views on waste
4. Agreement to the UK Waste Strategy's hierarchy to minimise waste, but possibly also need to maximise use of existing wastes (which could include landfill, mine gas, straw, manure etc.)
5. Recognition that many resources can only be used where they are produced, counterproductive to transport long distances
6. On biomass mixed views - much positive but also landscape concerns. Suggestions that, rather than SRC, should first use existing wastes i.e. forestry or wood products. Plus be more low tech than project ARBRE, i.e. wood fired boilers close to raw materials.
7. Some look ahead to "longer-term" technology fixes i.e. fuel cells and PV, saying presentations too negative
8. The existing electricity generation in our region has major environmental effects – both power stations and power lines. Could this RE be seen as replacing existing generation with positive effects?

ISSUES OF LOCATION

1. Nothing on areas or on wider benefits derived. Debate kept coming back to visual and philosophical issues.

NEED FOR EDUCATION

1. All agree need education to sell RE and the wider links to a better community and "a better quality of life"

PLANNING ISSUES

1. Recognised as big issue, especially local parochialism
2. Some pushing for firm targets given top down through RPG and for each Local Authority, maybe even precise location. Others suggesting give a target and let each LA determine how to meet it (like housing?)
3. But also agreed that need community agreement!
4. Group view that don't confuse community with the planning committees - get RE into the community strategies that may take the wider view, and away from just LU planning.

OBSTACLES

1. Without greater pressure, group believed that neither business nor public would actually change their behaviour and support RE.
2. Must have an environment that positively encourages take up – probably centrally driven
3. Must have a formal regulatory framework i.e. that business must have 10% RE in their energy use. Same with all big employers.
4. Government (or someone) to impose the 10%, leaving local decisions on just what & where.

OTHER MATTERS

- A distinct lack of discussion of the economic, social and environmental links to renewable energy. Nevertheless these seen as extremely important

GROUP B (Green Breakout Group)

Facilitator: Ian McCubbin AEAT
Rapporteur: Giles Barwell AEAT

Key points arising from the discussion are summarised below:

TARGETS

A general discussion of the nature of, and approach to, targets. Issues raised included;

- "Compulsion": Some sympathy with the idea that targets should be compulsory, possibly even down to the local level
- Relation to energy efficiency: The scale of the RE target could be reduced if vigorous energy efficiency initiatives succeed
- Locational issues: The relative merits of specific or general approaches to the location of RE schemes. Advantages and drawbacks to both. Clear that strategic thinking is vital in either case

POSSIBLE SCALES OF RE DEPLOYMENT

The group discussed the relative merits of different scales of RE scheme at some length, mostly without specific reference to individual technologies. Key points emerging from this were:

- The advent of the Countryside Agency's "Community Renewables Initiative" was seen as very important for emphasising local benefits and ownership, reducing NIMBYism and overcoming other barriers to deployment
- To overcome the problems of public perception caused by a lack of "mass engagement" with RE, everything possible should be done to encourage deployment of RE at the "personal / consumer" scale, so that large numbers of households could directly benefit from RE and understand the implications
- In the light of the previous point, a recognition that scenarios for deployment would need to develop a "balanced approach" involving scheme scales across the size spectrum
- The benefits of RE at local level needed to be "sold", through a combination of increased understanding within local authority decision-making and developer-led emphasis on such benefits for individual schemes

KEY "NON-ENERGY" BENEFITS OF RE

The group highlighted two of these, **Security of Supply** and **Rural Re-generation**.

GROUP C (Red Breakout Group)

Facilitator: Suzanne Ogier TO'R plc
Rapporteur: Tony Duffin AEAT

Key points arising from the discussion are summarised below:

TARGETS
There was general discussion as to whether targets are useful in themselves. The Group concluded that targets are useful and should form a part of the study. Further discussion related to whether targets should be realistic or aspirational. It was suggested by some group members that two targets could be set, one that could be more realistic in the short term with a larger, more aspirational target for the long term.

SCALES AND TYPES OF DEPLOYMENT
The group discussed at some length the relative merits of using large scale schemes to achieve a given target as opposed to the merits of using small-scale schemes which might be at the householder level and which could engage local communities. It was recognised that small-scale schemes would not be able to contribute large amounts of electricity and it would therefore be difficult to meet a given target. Large numbers of schemes would be required to generate even small amounts of electricity. It was generally agreed that there is a need for a variety of scales of deployment as appropriate to particular locality and technologies.

There was disagreement within the group as to the practicality of utilising small-scale biomass schemes to contribute to renewable energy growth in the region.

PLANNING ISSUES
Planning was recognised as a constraint to schemes coming forward.
The study should seek to make recommendations that might overcome planning obstacles.

ANNEX D3 STAKEHOLDER STATEMENTS RECEIVED

Stakeholder Response	Name of Organisation
1	Leeds Friends of the Earth
2	Leeds City Council
3	Yorkshire Dales Society
4	English Heritage
5	Hull City Council
6	EnergieKontor Ltd
7	GOY&H (DEFRA)

LEEDS FRIENDS OF THE EARTH

1. What renewable energy projects do you or your organisation know of within the region? What is your opinion of them? What examples of "best practice" do you or your organisation know of, whether within the region or elsewhere?

Wind Farms: Ovenden Moor, Royd moor, Chelker – good, clean way to generate electricity; noise, visual impact are acceptable.
Biomass: Fibrowatt at Scunthorpe; ARBRE at Eggborough – two significant biomass developments – good to have them as demonstrations of biomass technology in the region. Also small scale biomass heating development at private farm / office development north of Leeds – excellent example of small scale RE development.
Sheffield Incinerator – connection of a generating plant to a heating grid to run as CHP is good. However MSW incineration is NOT a renewable energy technology and should not feature in a RE strategy.

2. The Government has set a target that 10% of national electricity needs could be provided from renewable energy sources by 2010. Based on the need for the region to make a contribution towards this target, and the briefing material showing other regions' prospective targets and their composition, what level of electricity generation from renewable energy by 2010 could Yorkshire and the Humber aim for and why?

Y&H should be aiming for well above 10%. There is huge expertise in the region in the field of conventional power generation (Drax, Ferrybridge, Eggborough coal fired plants, gas CCGTs in Humber etc.; presence of major energy co.s – Innogy, British Energy etc., UK Coal). Conventional energy production is a major employer for the region. As conventional fossil based energy production declines, the region should seek to replace it with a thriving RE industry. The region should be seeking to take advantage of its good engineering skills base, the significant RE resources available in the region and the fact that there are significant RE developments already in the region to become a regional centre for RE in the UK.

3. What 'mix' of renewable energy types, sizes and numbers would you like to see for achieving this target and why? How large a contribution should each form of renewable energy make to a target (i.e. 'small', 'substantial' or 'as large as possible')?
The strategy should exclude landfill gas and MSW incineration. Whilst use of LFG from existing landfills is desirable, the strategy should not be used as a means to justify further landfill development. The aim of the strategy is to limit environmental damage. MSW incineration should therefore not be associated with the strategy as it conflicts with better environmental options such as waste minimisation and recycling.

The mix of other RETs should be determined largely by the resources available in the region and the practicalities / economics of each technology for the region. It would be an advantage to ensure a diversity of technologies and projects at a range of scales. The contribution that small scale projects can make must be recognised. Longer term technologies should be included in the mix now, even if at only a small scale, to provide regional demonstrations of the technology as a base for expansion as the technologies become more cost competitive. This is especially true of solar PV.

4. In addition to their energy-producing (and greenhouse gas reducing) potential, renewable sources may have other advantages (e.g. rural diversification, job creation) or disadvantages (e.g. visual impact). In achieving the electricity generation target from question 2 above, how can the region seek to maximise these benefits and minimise any drawbacks?

5. Where, in your view, should different forms of renewable energy schemes be located within the region (in broad terms) and why? (please refer to environmental character i and broad locations such as industrial, urban, town/village setting, agricultural land, sparsely populated countryside, coastal areas). What do you feel are the key constraints or opportunities within these areas?

Siting should be appropriate to the scale and nature of the project. Wind farms and large areas of energy crops should be excluded from AONBs and the National Park. Siting should maximise benefits – for example it is preferable to build a biomass electricity generating plant where there is a user for waste heat. Where possible, brown field sites should be used for new plant.

6. Does your organisation have a policy in relation to renewable energy development? If so, please describe it or - if possible - append (including LA21 / community plans). How do you envisage that this policy will help to deliver a prospective renewable energy target for Yorkshire and the Humber?

Leeds FoE policy is to support the development of genuine and appropriate renewable energy projects as a means of cutting polluting emissions. MSW incineration is not considered to be a renewable energy source by Leeds FoE. FoE will actively engage in lobbying of local, regional and National Government and industry in support of ambitious targets for the development of RE projects and against the use of fossil and nuclear fuels.

7. In addition to your policy (Q6) what actions will your organisation take to help deliver a renewable energy target across the region? What actions should central government and other regional organisations (e.g. Government Office, Yorkshire Forward, the Yorkshire and Humber Assembly) take?

Central Government should strengthen planning guidance to support development of RE projects. It should provide financial support for the development and demonstration of RETs to help build a strong UK renewables industry. Penalties for electricity companies failing to meet their renewables obligation should be made larger to provide greater financial impetus to the development of RE projects.

Regional organisations with significant energy budgets should take a lead by, for example, purchasing energy under ‘green tariffs’ and developing in-house projects (e.g. biomass heating / CHP schemes for municipal bulidings; building integrated PV / passive solar design in LA housing).

GO and Yorkshire Forward should seek to attract appropriate developments to the area. It should be made clear to potential developers that developments that include RE and CHP schemes will be favoured.

8. How should the planning system deliver renewable energy targets?

Planning guidance should make a presumption in favour of RE projects.

9. What do you expect this study to establish and why? What should it lead to next?

This study should make clear the various options and the resource available in the region for each option. It should form part of a coherent strategy to develop RE in the region. The strategy should include targets and specific actions. A resource assessment alone is of little use if it does not lead to actions to help develop the resources.

10. Any other comments you wish to make (including the methodologies employed, availability of improved data)?

Even though solar PV is expensive now, it is a technology with huge future potential and it should therefore be included in the strategy.

Many RETs are suited to implementation at a small scale, and the strategy should recognise this and not just concentrate on high profile large projects. However large projects can stimulate smaller ones – e.g. the fuel supply infrastructure of a large scale biomass project can be harnessed to supply fuel for smaller scale ones.

MSW incineration is not a renewable energy technology and should not be included in a resource assessment.

The resource assessment is only a first step and should be accompanied by a strategy to implement RE projects in the region.

LEEDS CITY COUNCIL

(Responses are within the framework of the Stakeholder Questions shown within Annex D1)

QUESTION 1

In Leeds we have four landfill sites where methane is extracted. The Energy Forum Study has highlighted these sites. In addition we have one major CHP installation at Leeds General Infirmary.

ETSU previously carried out a Best Practice study of a Methane Landfill Gas facility at Middleton in Leeds.

Leeds City Council is to launch its Draft Waste Strategy for consultation in November 2001. In order to meet Best Value, Government, EC Targets and guidelines for the foreseeable future it is extremely likely that the landfill option will be a last resort for Leeds waste. Therefore future extraction of methane beyond current deposits will be limited once the Waste Strategy is implemented.

QUESTION 2

The political consequences for energy and renewable energy after the terrorist attack in the USA on 11 September have major implications for the future energy supply for the UK and by implication on the amount of Renewable Energy that could be supplied by the Yorkshire and Humber region.

Margaret Beckett, Secretary of State in her speech to the Green Alliance and ERM on 24 October made the following comments, which have either a general or specific relevance to this and other questions you have asked.

I have included the relevant sections of her speech here (Italics)

Environment, Food and Rural Affairs Secretary Margaret Beckett today outlined the UK's big challenges ahead to improve people's quality of life and make the world a better place to live.

** Britain's intention to ratify Kyoto along with other EU member states in time to allow Kyoto to enter into force by next Autumn's World Summit on Sustainable Development;*

** a ground-breaking initiative to use state of the art micro-Combined Heat and Power units in 6,000 homes to help meet climate change targets and help tackle fuel poverty.*

** a high level Waste Summit to be held this autumn to deal with the country's growing waste mountain;*

The last month has reinforced an important lesson. That we need to work together to solve common challenges, to address the common good. It has reminded us that there are challenges so great, that they are beyond the capacity, not just of an individual or of a family or even a country, - but almost beyond our capacity as a world to solve not only unless we work together but unless we find new ways of working together.

The fact that addressing the common good must be our common cause is utterly familiar to all who have become engaged in debate about climate change and other environmental issues. It was recognition of the impact across the world of climate change that was the first real wake-up call that made us recognise that we are inexorably a global community.

And it was the impact of the changes we have inflicted on our environment which forced people to accept with a directness that has not flowed from other problems which cross national boundaries, the degree to which these common problems are only susceptible to common solutions. To put it crudely, the richest person in the world might just be able to provide their own water supply, though it's hard to see that they could be absolutely confident of making it pollution-free. But no-one, absolutely no-one, can buy their own personal ozone layer.

I want Britain to be a leading low-carbon economy; our expertise and technologies used across the world to tackle pollution and climate change. The global market for green technologies is worth £235 billion a year and is growing rapidly. As well as support from the Renewables Obligation, we are providing an additional £260m to fund blue sky research and bring on stream the next generation of renewable energy technologies. We are investigating further incentives for low-carbon or carbon-free technologies. You are the experts on this, so we look forward to hearing from you in the future on how best you think we can deliver this aim.

But what is equally clear is that technologies alone are not enough. The Carbon Trust's research is showing that technologies need skilled people - people trained to develop, use and maintain the technologies. I am told that there are already shortages of people trained to install today's low-carbon technology, such as energy-efficient boilers, and of welders for extensive pipework systems.

There is a range of new inventions and new technologies. In the next few years I am told we'll see hydrogen-powered cars on the road, with the prospect of pollution-free driving. We will see micro-CHP units in the home generating heat and light much more efficiently. And let me take this opportunity to reaffirm that as part of our strategy of supporting best practice and promoting innovation we will shortly publish a draft CHP strategy to help ensure that the UK doubles the amount of this power-generation technology in use despite the difficulties the industry is facing at present. In fact I want to announce today a ground-breaking initiative to use state-of-the-art micro-CHP units in 6,000 homes. At one and the same time this will help us meet our climate change and CHP targets, give a boost to new green technologies and help in our strategy to tackle fuel poverty.

But while we try to cut the level of waste, we also need to tackle how we handle the 400 million tonnes of waste we produce each year. We must substantially increase re-use, recycling and composting. But we must also recognise that we have to face up to some unpalatable decisions and choices that even the pursuit of these policies may require, - and also to the recognition that the use of those policies alone may not be enough. There are profound disagreements over disposal methods. We cannot allow ourselves the luxury of too easily closing down our options. I believe we need to come together to face up to the hard choices that will have to be made and for that reason intend to hold a Waste Summit in mid-November, to see if we can agree some shared priorities with our stakeholders. But

let me stress with all the force at my command that this discussion will be a means to an end and not an end in itself. It will not be an agreeable day airing our individual or mutual prejudices but the start of a process we need to pursue together.

It is clear from this speech:
1. that Energy is the major issue facing the country and that renewable energy and renewable energy technologies are going to have a significant impact.
2. that Waste to landfill is not an option - but that waste to energy may well be an option
3. that there are significant funds being made available for Renewable Energy projects
4. that there is significant high skilled employment opportunities not only currently but for the future as well.

Notes
1. Leeds has not ruled out Waste to Energy as an option and will consider further in the context of the emerging Waste Strategy.
2. A significant proportion of Leeds MD is countryside, through farm diversification opportunities exist to promote renewable energy (see response to question 4)

QUESTION 3
Leeds City Council has published a Sustainable Design Guide for developers and site designers. It sets out the principles of sustainable development and how these can be applied in practice to the development process. This document has sections on Combined Heat and Power and Solar Heating.

Both these could have a part to play in any Renewable Energy Strategy. All renewable energy projects will have an impact on the Planning Process. It is vital therefore that Planning Departments across the region are closely involved and are seen to be part of this study.

QUESTION 4
Maximising Potential Benefits

- I have mentioned earlier the potential for local jobs

- Here is a summary of a research report into planning and farm diversification which was launched on Tuesday 23rd October by Lord Falconer (the Planning Minister).

It stressed that the **planning system must help farmers branch out into other businesses**. This is especially pertinent in light of the recent crises in the countryside.

Key points:

- need for **consistency** in the way farm diversification is addressed
- many planning officers, especially in more urban authorities, have **limited experience** of agricultural and farm diversification issues
- **early discussion** between planners and farmers is useful in improving the quality of farm diversification applications
- diversification into **tourism** is the most common form

Minimising Drawbacks

1. Bringing all the homes in Leeds up to a satisfactory Energy Standard will cost an estimated £750 million pounds (HECA Report 1996 – 2011)
2. There is potential here for some form of combined heat and power
3. However, more important than this is the fact if you can cut the city's or regions total energy use then by de facto the 10% Energy Target is going to be less
4. I consider that there needs to be a closer link made to Renewable Energy and energy saving
5. Put simply it could mean 70 wind farms rather than 100. This will reduce the Visual Impact across the region referred to in your question
6. All Energy or Renewable Energy technologies create jobs and not only are these local jobs they can be relatively low-skilled and are labour intensive i.e. loft insulation, cavity wall foam filling, new CHP boilers etc
7. Also links to the Planning System if houses and extensions and other buildings are built to higher energy standards

QUESTION 5

Leeds has recently approved its Unitary Development Plan which goes up to 2006. The review would take the UDP up to 2016.

Any major Renewable Energy Project/s would have a big impact on the UDP and there could be major objections to any developments being sited in Leeds

The job creation aspect needs to be fully explored and exploited.

There could be major opportunities in the Lower Aire Valley Employment Area (AVEA). This is a 350 hectare site that could potentially offer Renewable Energy projects.

I have given Roy Watkin from ECOM Technology your contact details. ECOM have the technology it is claimed to convert sewage waste into energy which could the be used on the AVEA site.

Richard Askham 0113 247 8184 is the contact Officer in the Planning and Environment Department.

QUESTION 6

The Council adopted its Environmental Policy in 1998. It has 10 Overall Environmental Aims. One of these Environmental Aims covers Energy. This states:

"To minimize the city's contribution to global warming and other environmental effects of energy use, by reducing the consumption of energy use throughout all sectors of the city's community and by increasing energy conservation and energy–efficiency"

Within this context Renewable Energy is supported

The City Council has also:

Signed up to the Friends of the Earth Climate Resolution (May 1995)

This is:

"Leeds City Council aspires to achieve by the year a 30 per cent reduction from 1990 levels of carbon dioxide emissions due to energy and transport use in the local area. Recognising that this target can only be achieved through a combination of local actions and new policy measures from national government, the Council undertakes to examine ways in which this target can be met".

The Council is also implementing the Home Energy Conservation Act 30% CO2 Reduction target by 2011. HECA claims that over a million tonnes of CO2 per year will be saved by 2011 if all the measures identified are implemented.

Both these measures if fully implemented will have an impact on the total CO2 the City produces which will mean that a lower total amount of renewable energy would be required to meet the 10% target.

In addition the City Council is currently reviewing its corporate energy activities. These initiatives in turn will contribute to overall required targets.

QUESTION 7
Needs a joint approach by the Councils in West Yorkshire.

QUESTION 8
Proactive policies and area based planning initiatives could help address the specific land-use implications of renewable energy targets.

QUESTION 9
A clear framework on how and when the target can be met. Consequences for not meeting the target. Suggestions of solving the some of the problems associated with sighting of Renewable Projects.

QUESTION 10
The Planning Departments of all Local Authorities along with farming communities are crucial to this study. There is a need for a coordinated approach across the region on the implications of Renewable Energy on the Planning system.

It is crucial also that given the required dimensions of the initiative, that this is perceived as a key strand in the delivery of regional sustainability objectives embedded within the Regional Sustainability Framework, Regional Economic Strategy and Regional Planning Guidance.

THE YORKSHIRE DALES SOCIETY

The Yorkshire Dales Society is an independent registered charity which works in partnership with the Yorkshire Dales National Park, the Yorkshire Dales Millennium Trust, the Nidderdale AONB JAC, the Countryside Agency and many other Government agencies.

The Society's chief concern is for the special qualities of the Yorkshire Dales landscape, the support of effective social and economic strategies to support the rural communities in the Dales and to help foster the creation of conservation-related opportunities in the dales.

1. The Society is familiar with a very small-scale source of wind power energy situated at Chelker reservoir near Addingham, Skipton. The four structures are surprisingly visually intrusive from various angles and for some considerable distance, supplying a limited amount of power and have frequently been partly out of commission. This is unfortunate, another site could perhaps have contributed much more potential energy with increased efficiency.

2. We feel that Yorkshire and the Humber region should at least aim for the government target of 10% for the provision of renewable energy sources by 2010; a relatively modest goal. More effective might be to aim for up to 12% RE on the principle that targets are often eroded, with 10% as a bare minimum. We appreciate that an even higher RE target could well be counter-productive.

3. & 4. & 5. We would like to see a mix of renewable energy types which would be appropriate for particular areas, according to the type of terrain, density of population and other crucial factors.

Offshore wind power can make a substantial contribution of sensitively distributed (the Humber estuary is a good location) and likewise onshore wind farms could be a useful resource, provided they are carefully sited and screened where visually intrusive. They should not be placed in landscape which is scenically of high quality.

Wood biomass could make a substantial contribution to RE with similar safeguards as to siting. Not just visual intrusion and the potential noise of heavy machinery should be taken into consideration, but also constant transport movements and possible pollution from dust and other emissions. Care should be taken that the resource of fine landscape is not sacrificed to the interests of short-term economics.

Surplus straw and other agricultural waste can be regarded as a fuel source, possibly a relatively small one, but important nonetheless as encouraging the agricultural community to act as sustainably as possible. Municipal and industrial waste in urban areas could also be a substantial source of RE, but it is vital that the quality of life of the communities is not threatened further by highly noxious odours, noise, the pollution of the water table and visual intrusion.

We would see the use of landfill gas and small-scale hydro-power as being of value in particular areas as a more minor source of RE, but again it is important to encourage a full range of schemes which all contribute towards the larger picture, and equally important,

help to turn the tide of public opinion to focus on as wide a range of RE measures as possible.

Again active solar water heating to provide heat for hot water in buildings or swimming pools needs to be encouraged and the use of solar energy in the design of buildings for heat, light and ventilation may well be initially small-scale, but could increase proportionally as interest grows.

6. & 7 & 8. The Yorkshire Dales Society welcomes initiatives in the field of truly sustainable development and the reduction of greenhouse gases. Maximising the benefits of the above schemes and minimising the drawbacks can only be achieved by a thorough investigation of a wide range of factors. For example, further roads may need to be built to accommodate some schemes. This could increase congestion and actually increase pollution, with a potential negative impact on the environment; thus perhaps outweighing benefits like job creation. Care must always be taken about the way that new installations impact on the built heritage such as questions of scale, or on the land itself where there may be archaeological remains or where public rights of way need to be safeguarded.

We have indicated that it is just as important to safe-guard the living conditions of those who live in an urban environment as those who live in smaller villages or in the more sparsely populated countryside. Whether town, country or coast, every attempt should be made to screen or diffuse any necessary noise and possible emissions in order to add to general health and quality of life.

We feel that the way forward for RE would be to have certain fiscal incentives through the planning system encouraged by central government and regional organisations like Yorkshire Forward and the Yorkshire and Humber Assembly. An example might be of a private developer encouraged in this way to make use of solar energy panels for domestic housing by means of some financial incentive, and similar benefit also accruing to the home owner.

9. The Yorkshire Dales Society is basically in favour of a sustainable, structured, managed approach to RE which pays due regard to the various safeguards which have been itemised. The husbanding of our energy resources and the concerns regarding climate change make the task both challenging and imperative.

ENGLISH HERITAGE

English Heritage is the Government's statutory adviser on all aspects of the cultural heritage – including historic buildings and areas, archaeology and the historic landscape – and has a duty to promote public understanding and enjoyment of the historic environment. In contrast to the other government-sponsored environmental and conservation agencies, English Heritage reports to the Department for Culture Media and Sport. We do, however, work closely with those agencies sponsored by the Department for the Environment, Food and Rural Affairs, seeking to promote a holistic approach to environmental protection.

English Heritage recognises that the cultural heritage is under as much threat as any other aspect of the environment as a result of climate instability and, therefore, have no doubt that renewable energy will provide as essential environmental benefit. However, it is essential that, in setting targets for the contribution of electricity requirements which are met from renewables, full account is taken of the necessity to safeguard those other elements to which society attaches value. As national policy guidance makes clear, archaeological sites, Listed Buildings and the numerous other elements which make up the historic environment are a central part of our cultural heritage and our sense of national identify. Once damaged or destroyed, they can never be replaced.

A number of the Renewable Energy resources could, potentially, have a significant impact upon elements of the historic environment. Of the various sources being explored, the ones which concern us most are energy crops – not only because of the impact which they could have upon the archaeological resource and landscape of the region but, more worryingly, because their precise impact will be so difficult to adequately assess. Because of this, I have concentrated, below, primarily on this area.

Energy Crops

English Heritage recognises that the landscape must continue to evolve if rural communities are to prosper in the future, and we accept that energy crops represent just one more page to add to the continuing story. However, the potential scale and pace of energy crop planting could result in far-reaching impact upon both the landscape and the archaeology of the Region.

Given the Department of Trade and Industry's indicative figure that 125 kilohectares of planting will be required in order to "provide a significant fraction" of the Government's target of generating 10% of electricity from renewable sources by 2010 (DTI 1999), it can be calculated that as much as 1.4% of the total area of farmland in English would need to be converted to energy crop production. These are major land-use changes by any measure and must therefore be carefully evaluated in terms of their impact.

Within the Region, there are over 2,251 Scheduled Ancient Monuments with new additions currently being made as a result of a systematic programme of survey and enhancement. However, it is estimated that the designated sites represent only about 5% of the total number of sites of archaeological importance within the Yorkshire and the Humber Region.

The precise impact which Energy Crops could have upon archaeological deposits will depend upon the type of crop planted. Short Rotation Coppice, for example, planted

directly on archaeological remains could cause a variety of adverse mechanical, chemical and hydrological impacts, without adequate safeguards. Ground preparation for planting, the planting process itself, root growth and later grubbing-up of SRC could all disrupt archaeological stratigraphy and dislocate artefacts, destroying the ability to interpret key sites. Exudates from growing roots could also cause chemical deterioration of preserved materials. In addition, the growing crop's demand for water could locally lower water tables and cause the rapid deterioration of any remains preserved by the anaerobic conditions which pertain in waterlogged areas.

The potential impacts of Miscanthus, on the other hand, are less well understood, as little work appears to have been carried out on its below-ground characteristics. Even where detailed research has been carried out (for example if MAFF's otherwise excellent and very detailed scientific report on Miscanthus agronomy), little attention appears to have been paid to the reporting of below ground attributes and its archaeological impacts remain unclear.

In addition to the choice of crop type, the severity of damage caused by energy crop growth would depend on a number of additional factors, particularly previous land use and current state of survival of historic remains. For example, sites deeply buried beneath alluvium could possibly be protected from root or rhizome damage, and already desiccated remains need not be particularly affected by further changes in the water table. Future planting on archaeological sites, therefore, need not be ruled out of hand. Further research holds the key to this.

It is clear that far more research is needed on the differential impacts of a range of agri- and silvi-cultural land uses in terms of archaeological remains. It is also clear that this research should be carried out in the near future, if these considerations are not to impede progress in attaining planting targets. This is an area where DEFRA's research and development programme could make an important contribution, not least by simply acknowledging the need to consider below-ground impacts in existing crop trial projects.

In recent years, the Forestry Commission has established consultative and desk-based assessment procedures, in order to assess the archaeological impacts of planting, both on their own estate and through schemes such as the Woodland Grant Scheme. English Heritage is, therefore, extremely pleased that a requirement for similar procedures has been built into the new Energy Crops Scheme of the England Rural Development Programme.

With these procedures in place, it should be possible to avoid damage to significant archaeological sites where they are already recorded in local authority Sites and Monuments Records. We would suggest, therefore, that, in attempting to identify the limits upon the development of this technology, you take account of the constraints shown on the respective Sites and Monuments Record in those areas where the conditions appear to be favourable for Energy Crops. However, that the majority of the archaeological resource of the Region remains undiscovered, it is likely that there will continue to be some difficulties in assessing the impact of planting where archaeological potential is high, but the existing record of sites is poor. This will often be particularly acute where planting is proposed on grassland rather than arable land , or on alluvium or colluvium rather than on thinner soils.

In addition to the effects on archaeology, the impact on the landscape must also be an important consideration. Indeed, the landscape impacts of extensive new planting are as significant – and potentially more significant – than the visual impacts of the power stations themselves. We would be very concerned, therefore, where large areas of short rotation coppice proposed within a historic landscape. It is important that the landscape impacts of any proposals are assessed as thoroughly and as early as possible.

The approach detailed in your paper does not appear to take account of such constraints. Without this, the potential which energy crops might make to meeting the Renewable Energy needs of the Region could be greatly exaggerated and, consequently, unrealistic targets may be set.

Onshore Wind

The two principal concerns of English Heritage about this form of Renewable Energy relate to the effect which such schemes could have upon any archaeology on the site itself and the impact of wind turbine developments upon the wider historic landscape. The latter must include an assessment of the acceptability of such schemes upon the setting of Listed Buildings which, as recent Appeal decisions have shown, can include land many miles from the buildings themselves. It must also have regard to the impact of views into and out of Conservation Areas and upon historic landscape elements such as Historic Parks and Gardens and Registered Battlefields. Any assessment of the practicable potential of this resource in the Region ought to try to take account of these potential restrictions.

Photovoltaics/Active Solar systems

English Heritage's particular concern with these forms of Renewable Energy sources is the impact which they could have upon the character or fabric of historic buildings and areas. Given the statutory duty under the Act for local planning authorities to have special regard to preserving the Listed Buildings, their settings and any features of special architectural or historic interest they possess, it is unlikely that such systems would be acceptable on the majority of Listed Buildings. Similarly, given the general requirement that special attention be paid in the exercise of planning functions to the desirability of preserving or enhancing the character or appearance of Conservation Areas, the scope for wide-scale use in a large number of Conservation Areas may be limited. Consequently, we would suggest that the assessment of the numbers of buildings which may have potential for this type of technology should take account of these restraints.

Conclusions

The strategy has to be closely linked to the Regional Energy Strategy. It may well be the case that, because of the actions undertaken as part of the Strategy, overall electricity consumption within the Region over the next ten years or so is reduced to such an extent that it would be possible to set a target for electricity generation from renewables at a figure less than 10% and yet still achieve the same overall net result in terms of non-renewable energy consumption. However, the converse of this is that it is pointless setting a high target for electricity from renewables if, at the same time, the Region is not actively pursuing energy saving in other areas.

HULL CITY COUNCIL

1. RE Projects in the Region.

I have very limited knowledge of any RE projects in the Region, which given my role raises the concern that they are very poorly publicised. I was aware of ARBRE.

So far as Hull is concerned I am aware of one building that has PV panels on the roof.

The City Council is building a new secondary school (Endeavour on Beverley Road). That is expected to have small PV and wind turbine units, largely for educational purposes. We are also attempting to access DTI funding for a significant PV array but I have the feeling the funding will not come through in time to meet the design criteria.

I would like to see a regional directory of such projects. Bristol produced a small booklet giving information about such issues in their area and one for Yorkshire and the Humber could be very valuable in raising awareness and providing encouragement.

2. Government targets

The achievability of your Scenario C for our Region by 2010 was not discussed at the York consultation which I attended but my personal view is that it is over ambitious. In fact I wonder whether 10% by 2010 is achievable. However there is a difference between achievability and targeting and it could be argued that the target for 2010 could set the framework for ambitious goals by 2021.

I would set a Regional target of 10 or 15%. 10% could clearly be justified as being the Region's contribution to the national target. 15% could perhaps be argued as a Regional commitment and wanting to show we were more dynamic than other regions.

At the York consultation meeting I was not aware of discussion on the time scales set by the scenarios and I see the 2010 scenarios as particularly problematic. The discussion would have been fine if it had taken place in 1995 but I have great concerns of infrastructure change and planning permissions happening in time to deliver by 2010 when it is nearly 2002 now. This might change if there is considerable demand from generator businesses but if they are operating in an unprepared planning environment this could lead to opposition and this could get worse if there is a barrage of applications.

3. Mix of RE types

I think as a Region we should go for the full range, recognising that different authorities will have different preferences and constraints. However this should recognise the different stages of development of the different technologies and therefore focus on those best able to be delivered.

I think it is important as a Region that so far as possible we embrace all RE types. This will raise awareness of the different technologies and give experience of benefits and short comings associated with them.

I do not think it is possible for me to give any indications of size and numbers. I would see size as being dictated by local circumstances and numbers being reflected in the need to meet the Regional target.

4. **Other advantages and disadvantages**

The main problem I see is ignorance and this needs to be tackled by all available means at our disposal. In this area (North Bank of the Humber sub-region) we have had a damaging anti wind turbine argument presented in the local paper and this to my knowledge was the last time this issue was considered.

There clearly needs to be an informed debate which could be through the Councils but Hull does not lend itself to wind power, because of its urban nature, and the East Riding, I believe, has political problems arising from the paper campaign. An alternative vehicle could be the new Local Strategic Partnerships, which reflect the full range of local organisations and do not have the same problems of needing to be re-elected periodically. These bodies could potentially visit existing sites and see the issues for themselves. They will also control funding that could perhaps lead to developments locally.

5. **Locations**

Personally I should like to see RE schemes located across the Region so everyone gets a taste of what it is like. This could be strengthened if performance information was available periodically. This could be to local people about their local scheme and/or more generally, perhaps a website.

I do not feel able to suggest specific locations as I do not have the necessary knowledge. However I should like to see the proximity principle practised as this will reduce transmission losses and therefore improve generation efficiency. Clearly some authority areas will be more suited to a type of technology than others. My perceptions for Hull would be that wind and biomass would make a minor contribution but that PVs could be major.

At the York consultation meeting there was brief discussion about targets for authorities. I personally feel that unless Councils commit themselves to targets there will be little change. I would again suggest there needs to be a Kyoto style divvying up of what authorities are going to deliver. It may also lead to authorities tackling the realities. For example if Hull is going to deliver via a PV programme but the funding support is inadequate it can lobby for change through the Yorkshire and Humber Assembly. Presumably a Regional voice will have greater impact on Government than a single authority.

6. **Policy**

Kingston upon Hull City Council is a signatory to the Nottingham Declaration on Climate Change and is working to produce a City, not purely a Council, strategy by the end of 2002. I presume you are familiar with this so I will not attach it to this document but if you need information please contact me. The strategy will deal with RE.

The Council is purchasing as much "green" electricity as it can get and is also operating 40 electric vehicles.

It is difficult to see how the policy will actually deliver RE. It will endeavour to tackle the development control issues, possibly look at employment issues and look at means for reducing carbon dioxide production. However this is really creating the right environment for RE rather than commissioning it, which certainly the Council would be unable to address, except in its own building developments and these will be small scale. Work is being done on procurement in an effort to generate sustainable construction practices but again this is only where the Council is the procurer.

I should like to see the Council produce/adopt supplementary planning guidance on sustainable construction and hope this might provide opportunities to influence private construction schemes. A national plan that could be adopted locally would be useful, as would changes in legislation to strengthen the powers of planning authorities in this respect.

7. **Actions of the organisation**

This has been touched on a little in (6) above.

I personally see the greatest opportunities resting with central government. Setting targets for electricity suppliers creates demand for generation and therefore leads to efforts being made to construct RE plant. Building Regulations could be further developed as could planning controls. Funding support can also be addressed centrally.

I am less convinced of the role of regional bodies. They are relatively new and I do not see them as making a big impression at this point in time but this may change in the future. They might be able to do the Kyoto style work, referred to elsewhere, however.

8. **Planning system**

Again this has been dealt with to some extent above. The greatest impact I can see is from the adoption of Supplementary Planning Guidance so that RE can be considered in applications.

Another aspect is related to awareness in the general public and the generation of a positive outlook. This potentially would reduce the amount of public objection were schemes to be put forward.

9. **Expectations**

I should like to see the study provide informed analysis, which I believe it is doing. I should also like to see it bringing about infrastructure changes to facilitate actions at the local level. This might be a case of recommending local arrangements for making this happen.

It would be useful to produce information to feed into Nottingham Declaration activities. Several authorities will be pursuing this and it could be a useful vehicle with the right time frame.

10. **Other comments**

My perception of the difficulties include the following:

Funding. One of the biggest problems at the moment is the extra cost of installing RE. Our best local example is the school project referred to above and the only way it will incorporate significant PVs is if there is a way of offsetting the expense. Is there an economic argument for how this can be overcome? For example the vehicle Powershift Programme gives grants towards the extra cost of gas fuelled vehicles compared with the diesel/petrol equivalent. The grand plan is to create demand so that in the future costs are (more) comparable.

I appreciate there is funding in the pipeline for PVs but is it going to create the step change?

Best Value. A colleague at the York consultation day spoke of the benefits of getting this into the Best Value regime. On reflection I am not sure that this will necessarily tackle the problems as it is internal to the Council. Action through the Local Strategic Partnerships could be far more productive as it would impinge on businesses, the voluntary/community sector and the wider public sector.

ENERGIEKONTOR UK LTD

We would comment as follows on the various issues raised by the study and planning for renewable energy in the Yorkshire and Humber Region from our viewpoint as a wind power developer.

There can be no doubt that there is tremendous potential for onshore wind power in the Region as evidenced by the findings of your work so far. However, what is also very apparent is the fact that many of the most economically viable areas of potential are located in places where landscapes are currently covered by protective planning designations. Therefore there is either going to be considerable scope for conflict if the bulk of the best resource is to be utilised, a need for landscape designations and associated planning policies to be reviewed and amended to enable economically viable exploitation or an acceptance that the Region's wind resource can not be fully harnessed to help Yorkshire and the Humber Region meet national targets and play its part in reducing global warming. Whichever line is taken will obviously impact on the eventual targets that can be set in order for them to have any credibility. Wind is one of the most proven renewable energy technologies and this coupled with the Region's excellent wind resource means it could play a significant role in this respect. It would be most unfortunate for its role to be constrained.

For its part EnergieKontor UK Ltd would like to see as challenging a target as possible put forward for electricity generated from onshore wind in the short and medium term and actions taken by Government and other Regional stakeholders to help realise this. Such an action programme should include ensuring as favourable a planning regime generally within the Region as possible to facilitate the successful development of wind farm projects. This might mean taking a close look at AONB and similar local landscape designations and policies to rigorously and objectively assess whether wind farm developments are in fact an unacceptable form of development in principle for the countryside within these places. The relationship to farm and rural economic diversification is also extremely pertinent in this regard as the sustainable economic and social well-being of rural communities and wider environmental concerns may not be being afforded sufficient regard at present in comparison to the perception of the likely visual effect of wind farms.

Furthermore we consider it vital that local planning authorities are fully conversant with the issues surrounding wind farm development, especially awareness of regional and sub-regional renewable energy targets once these are adopted in Regional Planning Guidance, a Regional Sustainable Development Framework or some form of Interim Policy Statement. The existence of sectoral targets especially sub-regional ones should help to concentrate authorities minds as to how they are going to help deliver the Government's objectives. In this sense, targets are probably more preferable than areas of search, providing more flexibility for the wind farm industry to identify sites whilst having the assurance that the planning authorities must at the end of the day approve a number of projects at least in order to meet the targets.

GOVERNMENT OFFICE (FARMING & RURAL AFFAIRS)

Initial Feedback

Background

DEFRA's (formally MAFF) main focus, in terms of renewable energy, is on the biomass sector and in particular the growing of energy crops, such as short rotation coppice and miscanthus, poultry litter and other farm wastes, and arable crop residues (ie, straw) together with forest residues. Growing arable energy crops is regarded as one of the most significant measures for the agricultural sector to contribute towards meeting the Government's renewable energy and climate change targets. Therefore, the following comments will concentrate in this particular form of renewable energy. However, the Department recognises the need for a balanced portfolio of renewable energy generation, as set out in the Background Briefing Document.

Feedback Questions

1. DEFRA is aware, at a national and regional level, of a number of what might be termed large flagship schemes such as Project ARBRE, as well as the power plants at Eye, Ely and Flixborough. There are other smaller scale schemes, for example a small hydro-electric plant that is up and running at Kilnsey Park, Conistone-with-Kilnsey, near Skipton. The project, which was funded under the Northern Uplands Objective 5b Scheme, is based on producing electricty from excess spring water that feeds a trout farm. The amount of electricity generated is capable of meeting the needs of Kilnsey Park site requirements, with any surplus being sold as 'Green' electricty to Yorkshire Electricity plc. The system is designed to produce in excess of 27kW at full power and operate at 15kW plus on reduced summer water flows.

2. DEFRA is not in a position to determine specific levels of power generation, however, the target needs to 'challenging but achievable'.

3. Potential exists in this region for renewable energy generation from a range of sources including:

- Biomass (agricultural and forestry sources)
- Wind
- Photo voltaics
- Solar
- Small scale hydro electric

Waste derived energy should also be factored in but as a potentially diminishing resource, particularly if other forms of waste recycling and disposal reduce the amount of waste going to landfill in the next 10 to 20 years.

In terms of scale, then for biomass energy generation there is scope for projects for the large (30MW plus) to the small scale individual farm business, installing biomass fuelled boiler systems to generate their own heat and power supplies. To some extent this mix will be determined by available and emerging technologies as well as targeted project funding from Central and Regional government sources.

4 There is a wide range of issues raised by this question. To focus on two, regional strategies and community involvement. Firstly, renewable energy projects must be framed within the context of regional and local strategies in terms of planning and sustainability and secondly, they must have some element of community 'ownership', especially for the larger scale schemes that may have a larger impact in terms of economic and environmental sustainability.

Regional and local strategies are the framework within which the aims and aspirations of sustainable development will be achieved. Therefore, developers of renewable energy projects should be factoring in the positive aspects of regional policy guidance into their schemes in order to maximise the other, sometimes less tangible, benefits. Therefore, it also becomes increasingly important that these strategies and policies are framed in such a way to enable beneficial developments for generating renewable energy.

5. Environmental Issues

a. *Proximity principle*: Materials and energy crops should be sourced from close to the power plant. Power (and heat) should be used locally wherever possible. Local schemes should be designed to benefit local communities and enterprises (for example the Eco Centre at Swaffham in Norfolk).

b. *Landuse and nature conservation*: As well as nationally recognised landscape and conservation designations, energy schemes should also recognise potential impacts on land that is managed under existing Environmentally Sensitive Area and Countryside Stewardship Scheme management agreements, especially if an energy project involves 'hard' development on agreement land. Therefore, the existence of such schemes should be 'scoped' as part of any environmental assessment process.

c. *Land Quality*: Land still remains a significant resource particularly in terms of its capacity for agricultural production. It also provides the basic resource for the majority of other environmental activities and in combination with appropriate forms of management provides other resources in terms of landscape, recreation as well as food production. The productive capacity of the land is recognised through the DEFRA Agricultural Land Classification System. Although this system does not seek to impose a prohibition on the use of land for other non-agricultural purposes, it is an important factor when trying to balance competing land use requirements. In the case of energy crops such as Short Rotation Coppice and Miscanthus, it is also recognised that the higher quality, productive farm land will provide the best returns, both yield and financial.

d. *Other constraints*: Growing energy crops (and other forms of renewable energy) also will impact on other areas of environmental concern, such as landscape and archaeology.

6. DEFRA's overall aim is:
Sustainable development, which means a better quality of life for everyone, now and for generations to come, including:

- A better environment at home and internationally, and sustainable use of natural resources;

- economic prosperity through sustainable farming, fishing, food, water and other industries that meet consumers' requirements;
- thriving economies and communities in rural areas and a countryside for all to enjoy.

7. The **Energy Crops Scheme** is a DEFRA scheme run in partnership with the Forestry Commission, in England as part of the England Rural Development Programme. The Government envisages that the development of energy crops will yield environmental benefits and contribute towards the achievement of UK renewable energy targets. The scheme has two elements:

Establishment grants for short rotation coppice and miscanthus

Grants are available towards the costs of establishing these energy crops. Short rotation coppice (either willow or poplar) and miscanthus are considered the most commercially ready for exploitation.

Grants for establishing producer groups - for short rotation coppice only

Given that fuels need to be grown fairly close to the point of utilisation it is expected that producer groups will be set up to supply short rotation coppice to power stations and other energy end uses. We will provide funding of up to 50% of costs to assist in setting up associations of SRC growers.

These are environmentally beneficial crops. In substitution for fossil fuels they have the potential to make a significant contribution to reductions in one of the greenhouse gases (carbon dioxide) which drive climate change.

The scheme directly benefits growers through grants and has benefits beyond agriculture through the creation of jobs in rural areas.

Concerns over the siting of these crops are addressed through an environmental assessment procedure taking into account the views of the public.

Within the Yorkshire and the Humber region the scheme is available, although there are different arrangements for SRC and miscanthus on non-agricultural land and miscanthus on agricultural land within the South Yorkshire Objective 1 area.

8. At the National level, the planning system through guidance given in Planning Policy Guidance Notes and Circulars, seeks to enable appropriate development, while seeking to achieve a balance between conflicting economic, social and environmental issues. In the recently published Government response to the England Forestry Forum Working Groups reports, it was stated that –

"The modernising planning initiative aims to streamline and speed-up the planning system. We do not believe that producing additional PPGs is consistent with that approach. Indeed a number of outside organisations involved in the planning system (as well as many local planning authorities) have consistently argued for more focussed statements of government planning policy and fewer PPGs. This view has now been endorsed by Stephen Byers, Secretary of State for Transport, Local Government and the Regions. In his recent speech (26 July 2001) to the Institute for Public Policy Research the Secretary of State said that one of the issues the forthcoming Planning Green Paper needs to consider is whether planning is being asked to deliver too much and is being overloaded at the national level, and that therefore there may be a need for more focussed and less detailed PPGs."

At the regional and local level, planning policies must be included to enable appropriate development of renewable energy projects. Therefore, it is important that stakeholders are consulted and contribute to the regional and local planning process to ensure that the necessary policies are in place to help deliver the renewable energy targets.

9. The Study should establish what are the key economic, environmental and social issues that will impact on the development of renewable energy in the region and thereby influence the development of the targets. The Targets themselves must be based on a realistic assessment of the potential for the different forms of energy generation and their capacity within the Region. This will form the foundation to the assessment of the actual target figures. The study must then go to outlining the means whereby the targets can be implemented through, increased stakeholder involvement, both producers and consumers, influencing regional and local planning strategies, actively linking with emerging Government policy, encouraging and promoting renewable energy uses in local communities and households, as well as industry and commerce, and seeking to maximise the use of the funding available to develop renewable energy generation.

10. Other comments**:**

- Wood biomass is a good source of fuel for combined heat and power. It is already used in several CHP schemes, for example, Webbley School and Drayton Park.
- Energy crops do offer a significant potential. It is likely that for wood biomass the crop will be willow, for which the agronomy is now well understood. Further advances in plant breeding will also help to increase yields from willow grown as SRC.
- The Energy Crops Scheme is already supporting planting of SRC in Yorkshire as well as Suffolk and Cumbria. The study may also wish to investigate the potential for the establishment of biomass producer groups, which could benefit from funding under the Scheme.
- While GIS techniques are used to assess existing renewable energy resources, are the same parameters valid for the assessment of new potential resources?
- The resource map for short rotation coppice appears to suggest that the greatest potential in terms of odt/ha lies in the western parts of the region that are dominated more by pastoral farming. Yet the experience from crops grown for Project ARBRE suggests that there is most certainly potential in the lowland arable dominated areas in the east of the region. It is also these areas that are less likely to be constrained in terms of landscape, compared with some of the higher yielding areas shown on the map which appear to lie within or close to areas of high landscape value, such as National Parks and AONBs.
- When considering other biomass sources such a straw and farm livestock manure, etc., it may be necessary to identify within the resource the types of material that can easily be used for biomass conversion and those that are not, in order to get a more accurate assessment of the potential resource.

Feedback following December Meetings

Scenarios

In our initial comments it was stated that the target needs to be 'challenging but achievable'. We would still hold to that view and ask that the Regional assessment adopts a bullish view on the deployment of renewable technologies in the short term, i.e., up to 2010 and this approach should help to build the impetus for creating a strong foundation on which to build towards 2021.

This would equate to achieving the deployment levels set out in Scenario C for 2010 and looking to achieve levels of deployment by 2021 that equate to at least Scenario B.

The pursuit of a challenging target should then help to get the issue pushed up the agenda at the regional level by decision makers, funding agencies and the private sector, especially if some of the current barriers to developing and deploying renewable technologies are to be overcome.

Balance of technologies

Potential exists in this region for renewable energy generation from a range of sources including:

- Biomass (agricultural and forestry sources)
- Wind
- Photovoltaics
- Solar
- Small scale hydro electric

Waste derived energy should also be factored in, but as a potentially diminishing resource, particularly if other forms of waste recycling and disposal reduce the amount of waste going to landfill in the next 10 to 20 years.

In conjunction with the deployment of renewable energy technologies, there must be increased emphasis placed on *energy saving* at both the commercial and domestic level. This will involve building on existing and the development of new partnerships and initiatives within the community and commercial sector with 'education' playing a key role, helping to sell energy saving and increased use of energy from renewable sources (large and small scale).

The extra funding, which was recently announced by the Government, will be available to support those renewable technologies identified by the Performance and Innovation Unit (PIU) in its work on the future of UK renewable energy, including:

- Helping to get offshore wind off the ground
- Developing heat and electricity markets for energy crops, demonstrating new technologies, and building up the necessary infrastructure for energy crops
- Doubling the support available under the Government's intended major demonstration of innovative solar photovoltaics (PV)
- Support for renewable heat technologies

- Encouraging and promoting renewable energy in households and local communities
- Facilitating the connection of renewable sources to the UK's electricity network
- Taking forward the development of wave and tidal stream technologies
- Almost doubling the budget for fundamental research that will develop the next generation of renewable technologies

In the short term, the emphasis may rest on the development and deployment of wind and biomass derived energy as a result of this new funding and this will have to be factored in to the study.

In order to meet the increased demand for energy from woody biomass there will be the need to stimulate more woodland management across the region in order to produce the volumes of wood fuel that may be needed in future. Co-firing with wood at the coal power stations was one option thought worthy of more development, in an attempt to reflect the region's pro-coal position. Therefore, the existing timber resources with the region and close to its boundaries should be assessed, as this has the potential to be available almost immediately. The potential for establishing new areas of energy crops (short rotation coppice willow and miscanthus) will offer significant potential as a fuel source in the medium term for both large and small-scale energy generation. The importance of forest residues as a fuel source has already been demonstrated in the development of Project ARBRE.

Locations

The region contains the highest proportion of land designated for its national landscape value (27%) including National Parks, Areas of Outstanding Natural Beauty and Heritage Coasts. In addition to this, the region also contains a series of internationally and nationally important sites for nature conservation including RAMSAR, SAC, SPA, SSSIs and NNRs[25].

In view of this and the landscape impact that some renewable technologies may have, it will be important that a strategic approach is developed in partnership with developers, regional and local authorities and the community when considering the most appropriate locations for new renewable energy development.

With the publication of the Government's Green Paper on the future of the planning system, it will be important to have robust strategies in place at a regional level that are able to inform the local planning process, as it develops in the coming months and years.

The total agricultural land area of the region amounts to 1,177,057 hectares of which about 49% is in arable cropping and set-aside[26]. This gives considerable scope for expanding the area of energy crops grown within the region.

Regional Chapter (MAFF, 2000)

[26] *Farming and Rural Issues in the Yorkshire and the Humber Region*. (FRCA, Feb 1999)

Actions and activities

Once the regional (and any sub-regional) targets are identified, these targets should be adopted and implement primarily through the Regional Sustainable Development Framework and Regional Planning Guidance (RPG). Within RPG there is also scope to provide strategic locational indicators for the development of the various renewable technologies, with possible economic links to the Regional Development Agency's Regional Economic Strategy.

There is also the need to develop and carry forward a strategy for the delivery of the regional targets, through a partnership approach involving regional stakeholders from industry, community, agencies and regional/local government.

RPG should also take the lead in promulgating a positive, pro-active, strategic approach to planning for renewable energy. This should provide the guidance and basis for robust, enabling policies in local plans and community based plans. There is also the need to develop site specific criteria that can be applied to policies at the local level to help overcome some of the barriers (perceived or otherwise) in the planning system.

The importance of stakeholder involvement at the strategic and community level will be important to carry forward and implement the strategy, especially if challenging targets are set. This involvement must include increased awareness of the issues, the options (in terms of power generation **and energy saving**) and education at all levels within the commercial and domestic sectors in the region, so that the targets can be translated into successful and widely supported developments on the ground.

ANNEX D4 STAKEHOLDER CONSULTATION MEETINGS, 3-6TH DEC 2001

The format of each of these meetings was essentially identical, as illustrated in the following agenda. There were 8 discussion groups for the 4 meetings, summarised below (Hull 1 / Leeds 3 / York 3 / Sheffield 1).

Agenda for Stakeholder Consultation Meeting: 5/12/01
St. Williams College, 5 College Street, York YO1 7JF

Chair: David Owen, Government Office Yorkshire & The Humber

****
13.00 LUNCH
****

14.00 Welcome / Introduction / Background Briefing

14.10 Examples of Renewable Energy Schemes

14.40 The Regional Planning & Environmental Context

14.55 Introduction to Consultation Scenarios

15.10 Questions from the Floor

15.30 **Comfort Break**

15.40 Breakout Group Discussions

16.40 Summary / What happens next?

17.00 CLOSE

CONSULTATION SEMINAR – 3rd December 2001
Venue: Portland Hotel, Hull

Principal Discussion Group Issues

Scale of Target

A wide discussion of the scale of a regional RE target took place. Points raised included:

- The viability of a target depends crucially upon the region's ambition. If it believes in the cause then it should set a high target;
- A high target will act as a motivating influence upon subsequent actions. Aiming high will – in itself – encourage the belief that a high target can be achieved;
- The level of deployment implied within Scenario C (2010) should be adopted at least;
- It is nonetheless important to keep in mind the very real barriers to the deployment of specific RE technologies in setting a target;
- The context provided by the region's adoption of a 20% CO_2 reduction target is important.

Specific Technologies

- There is a reluctance to embrace (onshore) wind as one of the key routes to achieve the target. This may be particularly so in respect of the cumulative effects of wind energy schemes;
- Local Authorities (e.g. Hull CC) are currently aiming to encourage the deployment of "green power" through their power purchasing contracts. There is however currently not enough power to go round;
- There are significant current barriers to photovoltaics due to the cost of the technology, and issues such as net-metering and the interaction of schemes with the electricity grid.

Actions

- A key aspect to address is the extent to which different stakeholder groups identify with or "own" renewable energy issues. For example, Kirklees MBC have set their own target for RE which is a way of accepting responsibility for "doing their bit" and providing an example to others;
- Before accepting responsibility it is necessary to agree responsibility for relevant actions;
- It should not be forgotten that the planning process is subject to public opinion, therefore that public opinion needs to be brought along in the process of setting and achieving targets.

CONSULTATION SEMINAR – 4th December 2001
Venue: Leeds Town Hall

Group A Discussion

Targets for 2010 and 2021

- There should be strong links to an overall energy strategy for the region in the setting of targets, so that the bigger picture can be seen, Without this it is hard to comment upon the proposed targets.

Technologies

- Deployment of photovoltaics should be linked in with more energy efficiency measures.
- Some felt that "Scenario C" for wind energy was not that ambitious, others that it was too difficult to achieve.
- If biomass were to be more widely exploited, the replacement of oil-seed rape "monocultures" could be an advantage.
- Waste should not be included as a renewable energy source.

Locations

- The location of schemes was perceived to be the single most important factor influencing how they will be perceived.
- However there were many areas (e.g. National Parks) where it would be difficult to deploy much if any resource.

Barriers to Deployment

- There were some concerns expressed that RE technology does not always "deliver".
- Wider public perception is very important.
- There is a need to link to Community Plans for RE.
- Partnerships between Government, Local Authorities and others would be a good way to maximise the chances of successful deployment.
- It would be difficult to monitor and measure the amount of RE deployment activity with the advent of the Renewables Obligation.

Opportunities

- There is a need to link RE deployment to other infrastructure issues (e.g. economic development strategies)
- Education should be seen as an opportunity to break out of the "lack of knowledge" cycle, but is inevitably somewhat longer term.

CONSULTATION SEMINAR – 4th December 2001
Venue: Leeds Town Hall

Group B Discussion

Targets for 2010 and 2021

- Generally it was felt that the target should be ambitious and aspirational. This will present challenges but the region has the resources to meet these;
- It was pointed out that there is already an ambitious regional target for CO_2 emissions reduction and a significant increasing in the energy generation from renewables will be necessary to achieve this;
- As well as environmental advantages there are potential socio-economic pluses such as increased employment. The group would like to make the region a focus for RE development in the UK – this will maximise the benefits in terms of jobs etc.;
- The group did not want to get tied up in discussion about targets expressed in MW capacity – generally for 2010 they felt that renewables should supply at least 10% of the electricity generation in the region. As the region is a large net exporter of electricity this is doing more than 'their share' but they felt that this was appropriate;
- It was recognised that RE targets must be co-ordinated with the waste strategy;
- The group did not want to comment on the proposed balance between different renewable energy technologies – they felt it was important to move forward on all fronts;
- It was felt that targets were important to raise aspirations and that these should be both regional and local – working from both top down and bottom up;

Implementation

- It was recognised that this drive for a much greater level of RE would have a cost and an important part of making this happen would be establishing who would pay – particularly at the beginning to kick things off;
- The group recognised that if consumers could be motivated to ask for/buy renewables this would make implementation a lot easier.

There was particular discussion on two of the RE technologies:

Wind energy

- Some of the group felt that onshore wind had unacceptable landscape impact and all new large scale wind development should be offshore. Most disagreed;
- It was recognised that offshore wind will be more expensive that onshore. Also the region has less favourable resources than others in England and Wales – due to a steeply sloping sea bed which increases costs. However, it was agreed that offshore wind should still be pursued;

- For onshore wind the group felt that the main difficulty in deployment wasn't technical or cost related – it was in schemes getting planning permission. Various actions needed to be taken to address this:
  - Public attitudes to wind need to be changed by greater information and education;
  - There needs to be a strategic approach through the planning process;
  - The economic benefit to the local community, particularly in rural areas, needs to be clearly identified and where possible increased.
- It was noted that the changes proposed in the Planning Green Paper might help, particularly for large projects;
- Overall it was felt that a bottom up approach was more likely to succeed.

Energy crops/wood fuel

- Not all of the group were enthusiastic about wide scale planting of energy crops (e.g. willow coppice). There was a concern about the landscape impacts of this;
- It was agreed that management of existing woodland to provide wood fuel was very positive – providing fuel and also increasing the quality of the woodland;
- The possibility of using wood fuel in conventional power stations (coal or gas) – known as co-firing, was welcomed as a way of making generating from wood fuel cheaper and more practical in the short term.

CONSULTATION SEMINAR – 4th December 2001
Venue: Leeds Town Hall

Group C Discussion

In relation to the scenario tables presented, a delegate commented that we are starting from a low base; therefore, all of the targets presented would be challenging.

A number of barriers to the deployment of RE were identified including:

- Lack of political will
- NIMBYism
- A lack of understanding of global warming
- A lack of understanding of the threat to fuel
- A lack of understanding of the implications of the development of the third world and the resulting pressure on energy.
- Bureaucracy
- Public perception of RE

A number of delegates considered that Option C of the 2010 scenario should be pursued although this was not a unanimous view.

It was suggested that rather than 'navel gazing' we should be looking at examples of best practice, for example in Denmark and Germany to see what can be achieved. A delegate commented that there has been a lack of take up of EU funds that have been available for renewable energy in Britain. It was considered that there has been a lack of national will to pursue RE.

Delegates considered that it is important to engage the local community and encourage them to take ownership of RE as an issue.

It was pointed out that in conjunction with RE there is a need to pursue energy efficiency and to clean up other fossil fuel based technologies.

The importance of taking account of areas of landscape value was emphasised by a delegate. The value of the setting of particularly important parts of the region, for example York, was commented upon.

It was recognised that RE can present opportunities for rural areas. A range of scales of schemes will need to be developed that are appropriate to particular locations.

Examples of current activity in the region were given. In Bradford the Council has been pro-active by setting up a group to take forward RE. Connections have been made to a wider agenda. It was identified that there is a need to sell RE to Council Members. Whilst the original initiative in the Borough had faltered due to conflicting objectives between the Council and a RE developer in the group, a new group has recently been set up to pursue RE within the Borough. It was recognised that a range of technologies and scales will need

to be considered. A policy document, Vision 2020, has been published. It was recognised that there are difficulties with putting policy into practice.

In Kirklees a PV initiative has been established to increase installation of PV on buildings within the authority. With regard to PV a delegate outlined potential problems with net export metering where surplus electricity is produced. There are also issues of safety with regard to normal maintenance of the electricity supply network. The Sheffield CHP scheme was identified by one delegate as an example within the region. However, he commented that opportunities to link this system with schools and hospitals had not been taken up due to an apparent lack of communication and willingness from relevant city departments.

Delegates considered it important to establish 'champions' within the region.

A number of new initiatives were made known to the group including the 'Transforming Communities' initiative and the 'Powering future vehicles' initiative. Grants are available from both schemes to further RE.

A delegate considered that the true costs of the deployment of further RE should be established in terms of both monetary and environmental costs.

Potential for the use of brownfield sites for RE schemes was identified. However, it was recognised that there will be competing demands for the use of this land arising from other government priorities.

It was also recognised that there will be a need for people to be persuaded that RE is good for business. It was suggested that there is a need to work with developers to demonstrate that added value can be achieved and that RE can be a marketing tool. The representative from Yorkshire Forward commented that it is looking at insisting on RE being included when dealing with the disposal of land and development opportunities.

A number of suggestions of actions need to ensure the success of any targets were identified:

- Education
- National policy advice
- Workshops for councillors and planners regarding PPG22

A carrot and stick approach is needed. This might include grants and the identification of the long-term benefits of RE through lower household bills.

CONSULTATION SEMINAR – 5th December 2001
Venue: St. Williams College, York

Group A Discussion

Scale of Target

Points raised included:

- The region should "bite the bullet" and adopt a challenging RE target. The adoption of a "bullish" target would help to encourage the whole of this area to rise up the agenda;
- As well as a headline regional target, there should in addition be "devolved" targets. In deciding upon these, sub-regional bodies would need further information to assist them to develop such targets;

Specific Technologies

- Various views were expressed about wind energy's ability to contribute to a regional target. One developer view was that Scenario C (2010) for wind energy was quite conservative. Nevertheless the effect of "cumulative impact" for onshore wind energy was perceived to be an issue constraining wider deployment;
- A wind developer view was that the level of offshore wind outlined within Scenario C (2010) was "realistic".

Locations

- It was stated that National Parks were supportive in principle of locating RE within their boundaries at appropriate scales.

Actions

A wide number of areas of action were identified for pursuing the eventual target:

- In taking forward targets to "sub-regions" and below, additional regional expertise was perceived to be required;
- The whole area of regional action should be contained within a suitable strategic approach. This would help to reconcile the problems of putting principle into practice;
- Education was widely perceived to be of key importance in promoting RE deployment more widely. The means of applying this to wider groups needed further consideration;
- It would be extremely useful to have available wider information on the "planning history" of RE within the region;
- There could be a role in linking RE deployment more closely to "Best Value" initiatives within Local Authorities. This would definitely help to galvanise Member interest;
- Renewable energy could be perceived beneficially as "local" energy. On these grounds to would be useful to stress a version of the "proximity principle" in the deployment of schemes;

- The role of the RDA was considered crucial in encouraging appropriate approaches towards RE. As part of this the RDA's role in enabling a "low-carbon" economy was queried;
- To help achieve ambitious targets there was an extremely important need for integration of existing policies and funding streams at the regional level (which were currently very disparate when emanating at the national level);
- Community strategies should be seen as a potentially significant way to raise the profile of RE at local level;
- The planning system would be "able to cope" if a significant wave of new RE proposals arrived with it;
- Serious consideration should be given to giving RE "permitted development rights" within the scope of any changes introduced through the current Planning Green Paper.

CONSULTATION SEMINAR – 5th December 2001
Venue: St. Williams College, York

Group B Discussion

A delegate started the debate by asking whether we should aim for an aspirational or realistic target for RE in the region. Whilst one delegate initially felt that Scenario C (2010) was achievable it was generally considered that the region should aim high.

It was recognised that in aiming high there would need to be a cultural change to achieve increased deployment.

In relation to the planning system it was commented that this is generally reactive whereas there will be a need to be a more proactive approach if increased deployment is to be achieved. Partnerships between local authorities, developers and the local community are particularly important. There is a need for greater certainty which will be of benefit to all partners.

A number of delegates felt that there is a need for identification of areas of constraint and guidance as to what might be acceptable and where. This will be of particular relevance for wind schemes but was also felt to be of benefit for biomass schemes. Some delegates expressed concern at the potential landscape impact of SRC and therefore that there is a need for appropriate areas for SRC to be identified. It was concluded that the identification of specific locations in a local plan would not be of benefit as it would not be possible to take account of all relevant factors. A more strategic approach is needed.

Some delegates felt that there is a need to stimulate market demand in order for increased deployment to occur. One delegate commented that he felt that this would be achieved through the Renewables Obligation which would place an obligation on suppliers of electricity for a proportion to come from renewable sources. It was also asked 'how much are consumers willing to pay for green electricity?'

A number of delegates questioned the economic viability of some technologies and suggested that further schemes could be developed which had not been indicated on the scenarios tabled. Hydro was one example of this.

Delegates agreed that a broad mix of technologies should be brought forward at appropriate scales and locations. A number of delegates felt that further information was needed on all technologies in terms of their land take, cost, both economic and environmental and other requirements, such that a comparison could be made between technologies. With regard to specific technologies the deployment of PV in Conservation Areas was considered to be a difficult issue. Guidance on such issues would be welcomed.

A number of general locations were identified by the group as potentially suitable for RE deployment. These include brownfield sites and transport corridors. In relation to wind a delegate felt that areas of landscape importance and wilderness areas should not be developed. Areas of lower wind speed that might be outside of such areas were suggested as potentially appropriate locations.

The need to change public attitudes was recognised by the group as being an important factor in achieving increased deployment of RE. The general public will need to 'on board'. This might be achieved through local schemes that achieve a sense of public ownership.

It was questioned whether fuel cells could be regarded as a renewable resource.

A number of other issues were identified. These included:

- Funding
- The implications of the Planning Green Paper
- MoD constraints to wind energy
- Timescales for local plan reviews

A number of possible tools and initiatives were suggested. These included:

- A Regional Sustainable Energy Forum
- A Planners Forum concerned with RE
- The use of SPG as exists in Cumbria
- The role of the RDA

It was generally agreed that renewable energy should be pursued alongside energy efficiency and demand management measures.

Finally delegates were reminded of the need to keep in mind the wider picture, e.g. climate change.

CONSULTATION SEMINAR – 5th December 2001
Venue: St. Williams College, York

Group C Discussion

Technical issues

The region needs to take all practical technologies forward, particularly:
- Wind
- Biomass
- PV: housing projects

However, if energy efficiency measures take effect, aren't we going to need less wind farms etc? By analogy, we should not be building more roads to accommodate more cars, but reducing the number of cars.

RE technologies are developing fast: is there an argument for waiting, and getting fewer very efficient machines?

Hydro is not sufficiently reflected in the scenarios. Why not more hydro? Have there not been previous regional schemes?

In response, it was stated that the capital cost of hydro remains a limiting factor.

If wind is the most developed and most accessible technology, why are there not more developers in East Yorks? Are planning applications underway currently?

Are there credible alternatives to wind power, e.g. tidal energy (barrages, tidal current), wave energy?

For biomass production, localisation is important, in terms of plantations and people.

Planning issues

Is planning perhaps more of a challenge than an obstacle? Stated that developers have previously failed in the region by presenting their plans as 'single issue concerns' – balanced plans need to be put forward. Key arguments, such as 'sites in AONBs have higher wind speeds' need quantification in cost terms.

If RE targets are set for local authorities, but planning applications for wind schemes continue to be refused across the board, whose responsibility will it be? Local authorities could claim they have targets, but no acceptable plans have come forward. But developers will claim they have reasonable efforts to have their plans accepted! Will the 'stalemates' continue? Are penalties needed for Local Authorities?

To what extent are amelioration measures (e.g. Section 106 agreements) appropriate to RE developments? What are the real boundaries of Section 106? It is important that developers must not be seen to be 'buying' planning consents. Agreements should be used purely to

resolve potential problems caused by developments; e.g. TV interference due to wind turbines.

For wind schemes, to what extent is scale important, e.g. farms, industrial estates? This depends upon the extent it is coupled with local ownership.

There is currently a pressure to shorten planning agenda documents; this could have a negative impact.

Political issues

Should the region seek to maximise generation in the region? What are the limiting factors?

Yorkshire and the Humber already produces more than its "share" of energy for the UK. It should not be expected to be the renewable energy generator for the country. However stated that it should play more than its part if it can.

Is Renewable Energy good at all costs? No, because there has to be a balance between issues such as sustainable generation and ecology. Stated that ecologists are taking a short term view; soon there may not be species to protect if global warming continues. However land-take is a concern, even offshore.

There are real opportunities for getting communities involved. E.g. community involvement prospectus groups, made up of local businesses, co-ordinated by district authorities. Each has a distinct district strategy. Local demonstration schemes/information providers are important. For example the Countryside Agency initiative; 'Toolkit for Community RE Developments'.

Recent Climate Change predictions have a bleaker outlook. Will more government funds be forthcoming? What if there was a much wider approach to energy – linked to transport, perhaps? E.g. better public transport for the cost of visual intrusion from wind turbines.

CONSULTATION SEMINAR – 6th December 2001
Venue: Grosvenor House Hotel, Sheffield

Group Discussion

Political and Commercial issues

Stated that the Renewables Obligation will place an emphasis on optimum commercial solutions for suppliers. In which case Wind is clearly the strongest candidate. We can expect supply companies to be the 'big pushers' - while suppliers have their own agenda there will be opportunities for negotiation.

Developers need to see what happens after the Renewables Obligation has settled down - there has been a 3 year gap between the last NFFO round and the RO. Some investors are worried about the RO being changed or aborted by a later government.

Photovoltaics has complicated economics; excess ("spill") PV electricity currently has a very low value. Its situation might be different if PV panels were generally accepted as a building material and could be used as such. Perhaps building regulations have more of a part to play in encouraging the uptake of renewables such as PV?

How could RE developments be packaged/repackaged in an urban regeneration context? This could work very well for the region. A strong political message needs to go out for RE, perhaps coupled to regeneration issues.

Does there need to be a regional leader / champion? Who should this be? Local Authorities? Elected members? How about a regional RE 'supremo'? If no, is a 'wait and see' approach really sufficient? A partnership might motivate local government.

A supporting or promotional body of some kind is required, which would be able to pool knowledge and expertise.

What impact might devolution have on Renewables developments? Could there for example be a devolved energy forum? Is there a role for a regional commission?

Targets

2010 stated to be "too close" for a regional target, although there is a real urgency about the Government's 10% target. Local targets need to be technology-focused; they should give direction over what technologies will be best. They should also be ambitious but realistic.

Any targets should not be viewed in isolation, and should be the subject of ongoing review. Would a per capita target be better than a fixed target? The (Scenario C) targets described as 'ambitious' do not look that high in terms of numbers of developments, therefore not perceived to be unachievable.

Shouldn't the eventual goal be for 100% RE supply? When will/could this be? Implication that the region be aiming higher?!

More wind projects perhaps? (Sheffield stated to be looking for deployment of turbines). Suggestion re a regional 'Centre of Energy Excellence?'

'Subsidy' should not be seen as a dirty word! Local subsidies may be needed to stimulate initial developments. Match-funding presents hurdles for Renewables' deployment. Would there be benefits to bringing all the current government schemes together?

Technical issues

Which technologies provide the closest match to Yorkshire and the Humber's existing skillbase, in terms of manufacture and installation? Is there a skills/training challenge for the region?

More generally there is a lack of experience of renewable energy within the electricity industry. Nevertheless the whole market is going to change.

The NFFO arrangements have seen a gradual stepping down of prices for wind. This has led to 'strategic investment'. This process needs to be replicated for other technologies but over a shorter period.

Community wind schemes could have an Energy Service Company (ESCO) setup. This would lead to the key local benefit of 'ownership'. Income from a turbine or turbines could be donated to community projects, some which might not be supported otherwise.

Planning issues

There needs to be aggressive action on statutory plans (e.g. via greater sustainability content). This suggests individual LA targets, which are already beginning to happen. This would assist developers to develop schemes efficiently – they need clear signals from planners and other stakeholders.

ANNEX D5 CONSULTATION MEETINGS WITH LA PLANNERS, DEC 4TH / JAN 14TH & 15TH

Three meetings were held with Local Authority planners on the dates shown above. The format of each meeting was identical, as illustrated in the following agenda. Notes from each of the meetings are shown below.

AGENDA FOR PLANNING MEETINGS

1. Introduction

2. Brief overview of the background to the study
- Climate Change – the need for action
- Objectives of the Yorkshire and Humber study

3. Progress of the study
- Identification of the regional resource
- Development scenarios and targets
- Planning and environmental implications
- Policy responses

4. Open discussion – this will form a major part of the seminar

Your views on the following issues and questions will be of particular importance

- What priority are you currently giving to renewable energy ?
- What would help to ensure that you give it a higher priority ?
- What do you consider to be the main existing obstacles to the deployment of renewable energy from a general and a planning perspective ?
- What will need to be done in the future to overcome these obstacles ?
- Is there a need for further education of planning professionals and decision makers in respect of renewable energy ?
- What types of renewable energy do you see as having potential with Yorkshire & Humber and West Yorkshire in particular ?
- The wider contribution of renewable energy schemes to the region through employment generation, rural diversification etc. Your views ?

5. Next steps – taking the study forward

The progress of the Yorkshire and Humber renewable energy assessment can be followed at http://www.etsu.com/y&hre-study/

LOCAL AUTHORITY PLANNERS MEETING – 4th December 2001
Venue: Leeds Town Hall

Group Discussion

A number of mechanisms for achieving the deployment of renewable energy and involving the planning system were initially suggested by one delegate. These include the securing of RE as an integral part of other development, identifying and securing specific sites for RE and identifying new and more innovative ways of increasing deployment.

It was suggested that RE could be pursued along similar lines to affordable housing, i.e. that targets can be identified and a requirement that schemes of a particular size or scale must incorporate RE as part of that scheme. This was considered worth examining by other delegates.

It was recognised that the Y&H study is being undertaken at an opportune moment given that PPG22 relating to RE is under review and the impending release of the planning green paper. Delegates considered that opportunities to influence the content and direction of this guidance should be taken up. There is a need to take account of possible changes in technology in order that these are not forgone now.

A number of delegates questioned whether RE, as an extra obligation on developers would have a significant adverse effect on whether development came forward. It was pointed out that developers already have to contribute towards such off site obligations as cycle paths. It was questioned whether planning is the right arena for pursuing RE. There will be a need for industry acceptance of the whole issue of RE if it is to be deployed in increasing amounts in the future.

Delegates felt that there is a need to form partnerships with developers and for local authorities to be more proactive in pursuing RE. Partnerships should also be formed with the local community. Bradford currently has a local strategic partnership with representatives from the local community, business and members.

Delegates also felt that RE must be linked to mainstream issues such as housing that are more in the forefront of people's minds. However, it was recognised that there are difficulties in taking on wider issues associated with RE. There are also difficulties with gaining political will and the will of senior figures within local authorities.

Links to emerging Community Strategies were identified as potentially important to achieve increased RE deployment.

Other issues that will need to be addressed include:

- Achieving wider education, including through the use of examples
- The need to play the green 'card'
- The need to raise the profile of RE

Delegates noted that Kirklees has supplementary planning guidance on wind proposals.

The implications of Inspector's Reports for the development of RE were raised by one delegate. There was concern that Inspector's comments can prejudice and prevent the development of further RE schemes within an area.

It was considered by some delegates that the issue of sustainability has the potential to unlock the potential for RE deployment. It can be used to demonstrate need and provide justification for RE proposals. It was considered that RE needs to be seen as part of the bigger picture and also the smaller scale, for example, under HECA.

The wider connections of RE with the Climate Change Level and energy efficiency must be recognised. Wider opportunities for deploying RE must be also be recognised.

LOCAL AUTHORITY PLANNERS MEETING – 14th January 2002
Venue: Government Office, Leeds

Group Discussion

- Following the presentation by SO a number of delegates questioned whether the Merton policy example, which seeks the provision of 10% of energy requirements from employment proposals to be from renewable energy, was applicable in Yorkshire & Humber. It was felt that differences in land and property prices between London and the region may make this type of policy difficult to justify. However, it was considered that this approach might be useful within Leeds, for example.

- Some delegates felt that seeking a contribution from developers for renewable energy with housing schemes may also not be appropriate as there are already many other requirements sought from developers.

- It was suggested that an opportunity exists at the Millenium Village at Allerton Bywater for renewable energy to be incorporated. This scheme could be used as an example of how RE can be used within developments. Delegates were uncertain as to the current status of this project and at what stage it was at.

- Delegates considered that there was an important role for the Yorkshire and Humber Assembly and for the Regional Development Agency (Yorkshire Forward) in respect of the promotion of renewable energy and economic development.

- The role of RPG in promoting RE was questioned. It was established that targets would be incorporated into RPG. Guidelines would then be needed as to how these targets are to be achieved, with the role to be played by the Regional Sustainable Development Framework and Regional Economic Development Framework also established. An element of realism was viewed as important by a number of delegates.

- The implications of the planning Green Paper for renewable energy policy were queried by one delegate. In particular it was suggested that plans will need to be slimmed down. The relationship of this to the qualitative assessment of existing plans carried out as part of the study was questioned. A delegate suggested that perhaps renewable energy might be dealt with by way of a generic policy in the new plans with supportive aspects contained within non-statutory guidance. Other delegates pointed out that RE is only one small part of the planning issues that are covered.

- The consultants commented that the nine criteria used to assess existing policies had been developed through a number of regional studies and work undertaken for the DTI. It represented the key points which it was considered local authorities should include within their RE section. The implications of the Green Paper are difficult to determine at this stage. However, it may be considered appropriate for RE to be dealt with a separate issue, in the form of a subject plan.

- Delegates indicated that in all cases a RE policy was contained in their development plan. In some cases this had not been tested as proposals had not come forward. In

Harrogate an energy and sustainability guide has also been produced although this has not yet been adopted by the Council.

- The issue of locating RE proposals in Green Belts was raised and it was pointed out that these areas together with areas of archaeological interest are the only areas where there is a presumption against development.

- It was suggested that Section 106 agreements could be used as a vehicle to bring forward RE in association with development proposed.

- Whilst no RE proposals have been received within the Yorkshire Dales National Park it was established that objection had been raised to a number of wind proposals just outside of the Park's boundary. There was concern that such schemes might represent the 'thin end of the wedge' with any cumulative effect being unacceptable. It was suggested that there was a need for area identification with scope for schemes to fit into the local situation. One delegate later commented that areas of search had been suggested by a representor at their local plan inquiry. It was felt that local authorities do not, however, have the expertise to undertake such an exercise. Criteria based policies which allow for proposals to be assessed on a case by case basis were therefore considered to have merit.

- A number of delegates considered that the siting of schemes within the National Parks would almost inevitably lead to the sacrificing of the landscape. Whilst wind power was not considered able to make a contribution in the national parks, other technologies were considered to have some potential. In the North York Moors National Park a general policy for small-scale schemes for local communities exists. This is supplemented by policies contained within the statutory national park management plan.

- In many cases RE was not identified as an issue that had been debated at local plan inquiries. It had however been debated at the North York Moors National Park local plan inquiry where CPRE had sought a more positive stance on renewable energy. There had also been a debate in the context of the proposed policy as to whether there was a difference between unacceptable harm and demonstrable impact.

- In respect of RE on/off the coast delegates pointed out that the North Yorkshire and Cleveland Coastal Forum, which has an interest in shoreline management, Heritage Coast etc would be likely to comment on any proposals that affect the coast, whether offshore or onshore.

- Some delegates felt that there is a perception that wind in the region will have to be large scale whereas, as demonstrated by the approach taken by the national parks, this need not be the case.

- A delegate outlined his authority's experience of RE. One scheme of four wind turbines had been erected. He suggested that with any future scheme local consensus would be looked for. Whilst there had been some pre-application discussions with a wind developer this had not been taken forward. There had been little interest in RE as a means of diversifying agriculture.

- Whilst straw and poultry litter were viewed as a resource in parts of North Yorkshire and authorities were quite keen to see schemes developed no such interest had been shown. If schemes are to come forward issues concerning the suitability of location of the plant and transport of materials would need to be addressed. It was suggested by other delegates that the economic development departments would be ideally placed to encourage developers to bring forward such schemes. However, concern was expressed that in small authorities in Yorkshire resources would not allow this. In addition some authorities may only use this approach where it has been demonstrated to work elsewhere.

- Delegates suggested that specific resources should be flagged up where they are relevant to particular areas.

- Other suggestions were that the results of the study should be tied in with energy efficiency and the use of heat and that there should also be a link to the regional climate change study.

- Case studies could be used to demonstrate what can be achieved within the region and how these can contribute to the targets identified. In this respect the progress made by the North East was cited including an impending visit planned by the Northern Rural Network to the Leemore Business Park. Some concern was raised, however, that smaller authorities may have difficulties with funding and manpower to develop case study projects.

- It was suggested that there may be an opportunity for Business Link and Planning Aid to promote RE when looking at ways in which farmers can diversify in the region.

- Areas adjacent to existing industrial development were suggested as having potential to be used for RE. Issues of scale and the viability of schemes in such locations were identified.

LOCAL AUTHORITY PLANNERS MEETING – 15th January 2002
Venue: Sheffield City Council

Group Discussion

Delegates sought to understand how the study would be taken forward and whether individual local authorities would be expected to consider and endorse the report. The consultants confirmed that the study would be presented to Government Office, which had commissioned the study. The targets identified by the study would then be incorporated into the next review of regional planning guidance. It was pointed out that this study forms only part of the wider picture concerning renewable energy and energy generally within the region.

Delegates considered that the report should be considered by the Yorkshire and Humber Assembly and the Regional Planning Forum where local authority members will have an opportunity to comment on the conclusions and recommendations. It was also pointed out that the study should be tied into the Climate Change Impact Study which is to be completed in May 2002 and the Yorkshire Forward study on renewable energy already completed.

Delegates asked whether areas of search for wind could be identified. A number of issues were identified of importance. In respect of wind speeds there was some concern that areas that might have potential would be excluded on the basis of broad-brush wind measurements. A desire for flexibility was established. It was suggested that a broad framework for policies should be established.

It was questioned why PV was not seen as having a greater role within the tables presented and whether there is any further opportunity for offshore wind, particularly off North Yorkshire. Issues of cost were detailed in respect of PV whilst technical difficulties (including depth of water, grid connection, MoD and shipping lanes) associated with further deployment of offshore wind were discussed.

The potential for tidal power in the region was questioned by a delegate. The consultants commented that whilst there might be some suitable sites the west coast was better suited for this technology which is still at an early stage.

Delegates felt that there should be greater linkages between power generation, power consumption and power transmission. Comparisons with the issues raised by gas fired power stations were outlined. Whilst the power stations have not generated significant opposition there has been significant opposition to pylons and transmission lines, due largely to health concerns.

Delegates felt that the current system does not enable RE generation at the local community level. The need for a greater push for community renewables was therefore seen as important. It was pointed out that the ‘Community Renewables Initiative’ has recently been put in place. A need to link RE in to a greater extent with sustainability was also suggested. The Swaffham scheme was perceived to be a good example of what can be

achieved in a small community. A delegate questioned whether community schemes would be deliverable on the ground.

Delegates perceived that a requirement on industrial allocations that a percentage of energy must be generated from RE sources would not be as controversial as some other measures.

It was suggested that wind farms can contribute to farm diversification whilst only impacting to a small extent on the continued use of farmland. Delegates were informed that there are a range of factors that are used to assess the suitability of sites for wind generation. Wind farms need not in all cases therefore be sited on hill tops or at the coast. In this respect a delegate cited an example from his authority where developers had approached the local authority searching for suitable sites. The sites suggested by the council had not been favoured by the developer who had chosen to pursue an alternative area which they considered more suitable. This was felt to illustrate the difficulties faced by local authorities in identifying areas suitable for wind turbines.

In respect of biomass it was established that the chicken litter plant in North Lincolnshire is located on an industrial estate. Whilst there had not been objection to the burning of local chicken litter great objection had been raised to a subsequent proposal to burn rendered over 30 month carcasses from around the country.

A proposal for a CHP straw burning plant with associated glasshouses in the same district had raised issues of its location in relation to the population from which employees would be drawn as against the location of the material supply. Delegates identified potential for further straw burning activity in East Riding.

Discussion of the general approach taken by local authorities to RE was discussed. It was identified that a passive approach is generally taken. There is no active outside interest in promoting RE. The different interests of Council departments present difficulties in co-ordinating a proactive approach to RE.

Difficulties were identified by delegates in identifying site-specific allocations for RE within the local plan, as there is a need for the right information to be available to planning officers. This is difficult to ensure.

Delegates emphasised the importance of education of all those involved in the RE process including planning professionals, members and the media. There are also important differences in the perception of young and old people that need to be taken account of.

A delegate suggested that permitted development rights could be used with some RE schemes. Other delegates concluded that this may have some merit at the small-scale level.

ANNEX D6 OVERVIEW OF WIDER STAKEHOLDER COMMENTS RECEIVED ON DRAFT FINAL REPORT

Organisation	Principal Comments
Bradford MDC	**Officer Response** – How will EfW be treated? / Wind target for West Yorks supported / No CHP/ biomass for West Yorks? / Are fuel cells RE? / Care needed to support PV in light of recent planning decisions / How does region contribute to national picture if target met? / Amendments to Bldg. Regs. Required for RE as well as EE / LAs to adopt local RE strategy / Implementation must include others as well as national, regional, local Govt. / Case studies and briefing material supported, briefing needed for Members / Targets should not be perceived as "limits" / "Partnership" projects must involve Building industry for PV
BWEA	Greatly encouraged by onshore wind target / Broadly agree with sub-regional breakdown of onshore (West Yorkshire under-represented?) / Don't foreclose on "large" schemes / Broad agreement to Action Plan but urgency needed due to protracted timescale of, e.g., LA policy changes / Offshore wind numbers too low?
Council for National Parks	RE should be part of Sustainable Energy approach / RE should be planned strategically and consistently, GO should consider a sustainable energy "advisory group" to assist it / Strategic approach to RE in NPs required, large-scale RE inappropriate but small "sustainable" schemes should be actively encouraged as "exemplars" / RE development could be assisted by a sequential approach to planning within RPG as advocated by CA / Advice needed on visual integration of PV / LPAs to adopt RE SPG as more responsive to change than main policies, GOYH to encourage / LPAS to encourage RE on a broad front (plans and also "community" actions / "locally-administered" funding for "community RE", YF should support this
Countryside Agency	Uneasy over level of wind deployment – is this the only short-term option? / How can wind targets be accommodated, assessment of "character" required before this can be certain / "Economics" of PV – whose? (statement within Summary) / Target likely to meet with combination of resistance and apathy, and hence fail – better option to provide Govt. support for "less economic" deployment, away from sensitive sites, or else seek deployment over longer timescales
East Riding DC	**Officer Views** – Offshore wind potential recognised / Wind targets reasonable, subject to local restrictions / Biomass schemes should entail rail transport rather than mass lorry movements / Members should be included within LA "planners" briefings
Forestry Commission	A nil response
Govt. Office (DEFRA)	Encouraging to see ambitious targets for 2010 and 2021 / Regional (sub-regional?) targets should be

	implemented through the RSDF and RPG, possibly also link to Reg Economic Strategy – this should enable robust local policies / Action Plan should contain strategic "partnership" approach
Hambleton DC	Small-scale developments best suited to rural environments, easier to gain support for / "Flagship" partnership projects are key Action to undertake / Policies to be turned into reality through practical action
Hull City Council LA21	**Views Expressed by LA21 Task Group of Members** – City supports concept and wants to play its part / what about tidal energy, more from farm waste (manure), financial support for PV, support fuel cells (local firm involved)
Hull City Council Planning	Potential for wind along Hull docks / agree that waste should be treated separately / need for public education to ensure that voters do not derail Members' support in planning decisions
North York Moors Association	A long and detailed submission which needs to be read in its entirety
North York Moors NPA	Right to set ambitious goals but must not lose sight of community interest in e.g. North Yorkshire / NPs should deliver sustainable energy to their communities, not act as the home for national power production / Breakdown not varied enough and "too prescriptive" – need to allow for new technologies and ideas / Regional brownfield sites for wind limited?? / Info-Awareness and Incentives+Opportunities are most important Actions
National Wind Power	No "large" windfarms? / Urgent need to move the whole "awareness raising" activity into a new gear with Govt. Support for engagement with local amenity groups etc.
North Yorks County Council	**Officer Comments** – List of extant schemes provided / Further assessment needed to allow sub-regional breakdowns to be confirmed, particularly wind in North Yorkshire / Offshore wind and small wind supported / Agree with realistic targets for other technologies, however energy crops effect on landscape?
SCOSPA	"My recollection (of the York consultation meeting) was that there was a strong presumption against land based wind turbines especially in areas of high landscape quality as you say. Your verbal gymnastics ignores that fact. There was enthusiasm for off- shore deployment, and a reluctant acceptance of the need for onshore in some places but not areas of landscape value like the Pennines."

ANNEX E LIST OF INFORMATION SOURCES

1. "Lancashire and Yorkshire Renewable Energy Planning Study" (LYREPS), Terence O'Rourke plc, ETSU for the DTI, ETSU PR 006 (July 1997)

2. "Energy Forum Foundation Study", Ecotec Research and Consulting for Yorkshire Forward, September 2001

3. "*Small-scale Hydroelectric Generation Potential in the UK*", (ETSU SSH-4063, Parts 1-3) (1989). This study brings together much of the data required to characterise available SSH sites, such as geographical location, physical site parameters, meteorological and hydrological characteristics, power and energy yield estimates and economic analyses.

4. 'A review of the UK onshore wind energy resource', ETSU-R-99, F Brocklehurst available from the New and Renewable Energy Enquiries Bureau

5. 'Computer modelling of the UK wind energy resource: UK wind speed data package and user manual'. AEA Industrial Technology, Harwell ETSU WN 7056 for details.

6. "New and Renewable Energy: Prospects for the UK for the 21st Century" (Supporting Analysis) ETSU R122 (1999)

[i] "Countryside Character, Volume 3 – Yorkshire and the Humber", CCP 537 (Countryside Commission 1998)